TM: J. Morgan

First Quarterly Report

STUDY OF PROCESS VARIABLES ASSOCIATED WITH MANUFACTURING HERMETICALLY-SEALED NICKEL-CADMIUM CELLS

By

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Table 1A - Column Designation for Raw Data Listing

Column	Designation
1.	Group No. 1-8 Rep. 0, 1 Plaque Seq. 1-6
2.	Furnace Temp. °F
3.	Belt Speed, in./min.
4.	Dewpoint, °F
5.	Atmosphere amount
6.	Plaque spacing, inches
7.	1st Water Zone Temp , °F
8.	2nd Water Zone Temp., °F
9.	Plaque Seq. (Column 1, 3rd item)
10.	Wt. of 2 sq. in. Plaque, g
11.	Thickness, in.
12.	Void, cu.in./sq.in.
13.	Strength, lbs/sq in. of thickness

Table 1B - Listing of Raw Data - Plaque Study

101	1621.	6.	28.	390.	0.1	72.	92.	1.	1.617	0.0267	0.0212	441.86
101	1621.	6.	28.	390.	0.1	72.	92.	1.	1.659	0.0275	0.0218	431.41
101	1621.	6.	28.	390.	0.1	72.	92.	1.	1.688	0.0294	0.0236	416.49
101	1621.	6.	28.	390.	0.1	72.	92.	1.	1.713	0.0291	0.0232	398.55
101	1621.	6.	28.	390.	0.1	72.	92.	1.	1.698	0.0287	0.0229	423.40
101	1621.	6.	28.	390.	0.1	72.	92.	1.	1.627	0.0290	0.0234	361.18
101	1621.	6.	28.	390.	0.1	72.	92.	1.	1.704	0.0298	0.0240	405.39
101	1621.	6.	28.	390.	0.1	72.	92.	1.	1.701	0.0287	0.0229	409.74
101	1621.	6.	28.	390.	0.1	72.	92.	1.	1.729	0.0286	0.0227	385.10
102	1623.	6.	28.	400.	0.1	73.	92.	2.	1.664	0.0305	0.0248	362.81
102	1623.	6.	28.	400.	0.1	73.	92.	2.	1.688	0.0300	0.0242	387.50
102	1623.	6.	28.	400.	0.1	73.	92.	2.	1.728	0.0307	0.0248	381.97
102	1623.	6.	28.	400.	0.1	73.	92.	2.	1.753	0.0282	0.0222	480.99
102	1623.	6.	28.	400.	0.1	73.	92.	2.	1.659	0.0260	0.0203	549.19
102	1623.	6.	28.	400.	0.1	73.	92.	2.	1.709	0.0285	0.0226	415.51
102	1623.	6.	28.	400.	0.1	73.	92.	2.	1.675	0.0285	0.0228	415.51
102	1623.	6.	28.	400.	0.1	73.	92.	2.	1.713	0.0301	0.0242	372.5[illegible]
102	1623.	6.	28.	400.	0.1	73.	92.	2.	1.723	0.0298	0.0239	342.05
103	1625.	6.	27.	400.	0.1	73.	92.	3.	1.673	0.0306	0.0249	360.44
103	1625.	6.	27.	400.	0.1	73.	92.	3.	1.678	0.0304	0.0246	377.37
103	1625.	6.	27.	400.	0.1	73.	92.	3.	1.698	0.0318	0.0260	333.75
103	1625.	6.	27.	400.	0.1	73.	92.	3.	1.742	0.0304	0.0244	401.72
103	1625.	6.	27.	400.	0.1	73.	92.	3.	1.677	0.0297	0.0239	420.88
103	1625.	6.	27.	400.	0.1	73.	92.	3.	1.664	0.0295	0.0238	387.82
103	1625.	6.	27.	400.	0.1	73.	92.	3.	1.728	0.0296	0.0237	385.20
103	1625.	6.	27.	400.	0.1	73.	92.	3.	1.754	0.0306	0.0246	360.44
103	1625.	6.	27.	400.	0.1	73.	92.	3.	1.783	0.0307	0.0246	405.84
104	1635.	6.	26.	400.	0.1	72.	92.	4.	1.639	0.0300	0.0244	400.00
104	1635.	6.	26.	400.	0.1	72.	92.	4.	1.720	0.0301	0.0242	409.76
104	1635.	6.	26.	400.	0.1	72.	92.	4.	1.792	0.0295	0.0234	349.04
104	1635.	6.	26.	400.	0.1	72.	92.	4.	1.754	0.0297	0.0237	433.63
104	1635.	6.	26.	400.	0.1	72.	92.	4.	1.715	0.0295	0.0236	387.82
104	1635.	6.	26.	400.	0.1	72.	92.	4.	1.669	0.0294	0.0237	377.45
104	1635.	6.	26.	400.	0.1	72.	92.	4.	1.689	0.0303	0.0245	367.61
104	1635.	6.	26.	400.	0.1	72.	92.	4.	1.703	0.0308	0.0250	391.35
104	1635.	6.	26.	400.	0.1	72.	92.	4.	1.725	0.0293	0.0239	430.72
105	1640.	6.	25.	400.	0.1	72.	93.	5.	1.675	0.0306	0.0249	396.48
105	1640.	6.	25.	400.	0.1	72.	93.	5.	1.707	0.0298	0.0239	418.06
105	1640.	6.	25.	400.	0.1	72.	93.	5.	1.701	0.0307	0.0249	393.90
105	1640.	6.	25.	400.	0.1	72.	93.	5.	1.788	0.0301	0.0240	459.43
105	1640.	6.	25.	400.	0.1	72.	93.	5.	1.712	0.0282	0.0223	509.28
105	1640.	6.	25.	400.	0.1	72.	93.	5.	1.714	0.0302	0.0243	394.72
105	1640.	6.	25.	400.	0.1	72.	93.	5.	1.690	0.0296	0.0238	398.04
105	1640.	6.	25.	400.	0.1	72.	93.	5.	1.697	0.0295	0.0237	400.75
105	1640.	6.	25.	400.	0.1	72.	93.	5.	1.718	0.0315	0.0256	351.47
106	1635.	6.	25.	400.	0.1	72.	94.	6.	1.672	0.0306	0.0249	348.42
106	1635.	6.	25.	400.	0.1	72.	94.	6.	1.713	0.0316	0.0257	360.52
106	1635.	6.	25.	400.	0.1	72.	94.	6.	1.709	0.0323	0.0264	301.93
106	1635.	6.	25.	400.	0.1	72.	94.	6.	1.689	0.0322	0.0264	217.01
106	1635.	6.	25.	400.	0.1	72.	94.	6.	1.739	0.0306	0.0246	264.32
106	1635.	6.	25.	400.	0.1	72.	94.	6.	1.759	0.0314	0.0254	262.43
111	1623.	6.	30.	400.	0.1	78.	84.	1.	1.678	0.0308	0.0250	367.63
111	1623.	6.	30.	400.	0.1	78.	84.	1.	1.657	0.0307	0.0250	370.03
111	1623.	6.	30.	400.	0.1	78.	84.	1.	1.635	0.0300	0.0244	362.50
111	1623.	6.	30.	400.	0.1	78.	84.	1.	1.642	0.0296	0.0240	398.04
111	1623.	6.	30.	400.	0.1	78.	84.	1.	1.644	0.0278	0.0222	465.81
111	1623.	6.	30.	400.	0.1	78.	84.	1.	1.668	0.0304	0.0247	401.72
111	1623.	6.	30.	400.	0.1	78.	84.	1.	1.656	0.0298	0.0241	367.38
111	1623.	6.	30.	400.	0.1	78.	84.	1.	1.641	0.0286	0.0230	481.38
111	1623.	6.	30.	400.	0.1	78.	84.	1.	1.664	0.0302	0.0245	357.71
112	1618.	6.	29.	400.	0.1	79.	85.	2.	1.724	0.0292	0.0233	475.00
112	1618.	6.	29.	400.	0.1	79.	85.	2.	1.661	0.0299	0.0242	427.85
112	1618.	6.	29.	400.	0.1	79.	85.	2.	1.624	0.0298	0.0242	392.72

Table 1B (Continued)

112	1618.	6.	29.	400.	0.1	79.	85.	2.	1.693	0.0285	0.0227	457.06
112	1618.	6.	29.	400.	0.1	79.	85.	2.	1.679	0.0253	0.0195	597.57
112	1618.	6.	29.	400.	0.1	79.	85.	2.	1.668	0.0285	0.0228	457.06
112	1618.	6.	29.	400.	0.1	79.	85.	2.	1.647	0.0288	0.0232	434.03
112	1618.	6.	29.	400.	0.1	79.	85.	2.	1.638	0.0286	0.0230	385.10
112	1618.	6.	29.	400.	0.1	79.	85.	2.	1.642	0.0293	0.0237	406.24
113	1614.	6.	28.	400.	0.1	79.	86.	3.	1.730	0.0312	0.0253	427.61
113	1614.	6.	28.	400.	0.1	79.	86.	3.	1.690	0.0312	0.0254	381.38
113	1614.	6.	28.	400.	0.1	79.	86.	3.	1.679	0.0304	0.0246	389.54
113	1614.	6.	28.	400.	0.1	79.	86.	3.	1.705	0.0287	0.0229	491.69
113	1614.	6.	28.	400.	0.1	79.	86.	3.	1.687	0.0265	0.0207	592.74
113	1614.	6.	28.	400.	0.1	79.	86.	3.	1.724	0.0265	0.0206	576.72
113	1614.	6.	28.	400.	0.1	79.	86.	3.	1.697	0.0300	0.0242	412.50
113	1614.	6.	28.	400.	0.1	79.	86.	3.	1.704	0.0297	0.0239	433.63
113	1614.	6.	28.	400.	0.1	79.	86.	3.	1.682	0.0294	0.0236	403.48
114	1612.	6.	27.	400.	0.1	79.	86.	4.	1.709	0.0302	0.0243	394.72
114	1612.	6.	27.	400.	0.1	79.	86.	4.	1.683	0.0306	0.0248	384.47
114	1612.	6.	27.	400.	0.1	79.	85.	4.	1.676	0.0308	0.0251	415.07
114	1612.	6.	27.	400.	0.1	79.	86.	4.	1.726	0.0296	0.0237	410.88
114	1612.	6.	27.	400.	0.1	79.	86.	4.	1.694	0.0290	0.0232	454.82
114	1612.	6.	27.	400.	0.1	79.	86.	4.	1.725	0.0305	0.0246	399.09
114	1612.	6.	27.	400.	0.1	79.	86.	4.	1.680	0.0289	0.0231	444.50
114	1612.	6.	27.	400.	0.1	79.	86.	4.	1.693	0.0288	0.0230	406.90
114	1612.	6.	27.	400.	0.1	79.	86.	4.	1.670	0.0291	0.0234	438.41
115	1610.	6.	27.	400.	0.1	79.	87.	5.	1.717	0.0316	0.0257	371.79
115	1610.	6.	27.	400.	0.1	79.	87.	5.	1.686	0.0303	0.0245	404.37
115	1610.	6.	27.	400.	0.1	79.	87.	5.	1.690	0.0304	0.0246	353.02
115	1610.	6.	27.	400.	0.1	79.	87.	5.	1.659	0.0299	0.0242	352.35
115	1610.	6.	27.	400.	0.1	79.	87.	5.	1.648	0.0306	0.0249	384.47
115	1610.	6.	27.	400.	0.1	79.	87.	5.	1.691	0.0322	0.0264	336.36
115	1610.	6.	27.	400.	0.1	79.	87.	5.	1.646	0.0297	0.0241	357.11
115	1610.	6.	27.	400.	0.1	79.	87.	5.	1.626	0.0292	0.0236	369.44
115	1610.	6.	27.	400.	0.1	79.	87.	5.	1.620	0.0301	0.0245	360.10
116	1612.	6.	25.	400.	0.1	80.	83.	6.	1.678	0.0310	0.0252	503.38
116	1612.	6.	25.	400.	0.1	80.	88.	6.	1.722	0.0305	0.0246	471.65
116	1612.	6.	25.	400.	0.1	80.	88.	6.	1.653	0.0293	0.0236	458.65
116	1612.	6.	25.	400.	0.1	80.	88.	6.	1.639	0.0270	0.0214	570.99
116	1612.	6.	25.	400.	0.1	80.	88.	6.	1.639	0.0261	0.0205	594.53
115	1612.	6.	25.	400.	0.1	80.	88.	6.	1.669	0.0277	0.0220	513.17
116	1612.	6.	25.	400.	0.1	80.	88.	6.	1.650	0.0306	0.0249	372.45
116	1612.	6.	25.	400.	0.1	80.	88.	6.	1.643	0.0305	0.0249	338.62
116	1612.	6.	25.	400.	0.1	80.	88.	6.	1.728	0.0294	0.0235	442.52
201	1860.	12.	50.	800.	16.0	174.	89.	1.	1.710	0.0283	0.0224	561.88
201	1860.	12.	50.	800.	16.0	174.	89.	1.	1.677	0.0280	0.0222	573.98
201	1860.	12.	50.	800.	16.0	174.	89.	1.	1.717	0.0284	0.0225	543.98
201	1860.	12.	50.	800.	16.0	174.	89.	1.	1.672	0.0285	0.0228	512.47
201	1860.	12.	50.	800.	16.0	174.	89.	1.	1.644	0.0276	0.0220	487.36
201	1860.	12.	50.	800.	16.0	174.	89.	1.	1.693	0.0281	0.0223	512.91
201	1860.	12.	50.	800.	16.0	174.	89.	1.	1.699	0.0282	0.0224	509.28
201	1860.	12.	50.	800.	16.0	174.	89.	1.	1.660	0.0282	0.0225	523.43
201	1860.	12.	50.	800.	16.0	174.	89.	1.	1.638	0.0280	0.0224	473.53
202	1860.	12.	54.	800.	16.0	175.	90.	2.	1.712	0.0289	0.0230	511.85
202	1860.	12.	54.	800.	16.0	175.	90.	2.	1.698	0.0287	0.0229	505.35
202	1860.	12.	54.	800.	16.0	175.	90.	2.	1.665	0.0290	0.0233	494.95
202	1860.	12.	54.	800.	16.0	175.	90.	2.	1.728	0.0275	0.0216	639.67
202	1860.	12.	54.	800.	16.0	175.	90.	2.	1.711	0.0285	0.0226	554.02
202	1860.	12.	54.	800.	16.0	175.	90.	2.	1.719	0.0289	0.0230	538.79
202	1860.	12.	54.	800.	16.0	175.	90.	2.	1.752	0.0291	0.0231	611.12
202	1860.	12.	54.	800.	16.0	175.	90.	2.	1.700	0.0284	0.0226	516.08
202	1860.	12.	54.	800.	16.0	175.	90.	2.	1.713	0.0291	0.0232	571.26
203	1859.	12.	53.	800.	16.0	174.	90.	3.	1.636	0.0285	0.0229	526.32
203	1859.	12.	53.	800.	16.0	174.	90.	3.	1.647	0.0283	0.0227	505.69
203	1859.	12.	53.	800.	16.0	174.	90.	3.	1.712	0.0291	0.0232	504.84

Table 1B (Continued)

203	1859.	12.	53.	800.	16.0	174.	90.	3.	1.723	0.0278	0.0219	611.38
203	1859.	12.	53.	800.	16.0	174.	90.	3.	1.689	0.0268	0.0210	673.52
203	1859.	12.	53.	800.	16.0	174.	90.	3.	1.768	0.0285	0.0224	637.12
203	1859.	12.	53.	800.	16.0	174.	90.	3.	1.726	0.0277	0.0216	630.47
203	1859.	12.	53.	800.	16.0	174.	90.	3.	1.740	0.0277	0.0217	586.48
203	1859.	12.	53.	800.	16.0	174.	90.	3.	1.847	0.0278	0.0215	698.72
204	1857.	12.	53.	800.	16.0	173.	91.	4.	1.684	0.0293	0.0235	524.18
204	1857.	12.	53.	800.	16.0	173.	91.	4.	1.682	0.0290	0.0232	535.08
204	1857.	12.	53.	800.	16.0	173.	91.	4.	1.660	0.0293	0.0236	471.76
204	1857.	12.	53.	800.	16.0	173.	91.	4.	1.692	0.0280	0.0222	502.23
204	1857.	12.	53.	800.	16.0	173.	91.	4.	1.672	0.0285	0.0228	512.47
204	1857.	12.	53.	800.	16.0	173.	91.	4.	1.702	0.0283	0.0225	519.73
204	1857.	12.	53.	800.	16.0	173.	91.	4.	1.676	0.0292	0.0235	488.19
204	1857.	12.	53.	800.	16.0	173.	91.	4.	1.629	0.0285	0.0229	470.91
204	1857.	12.	53.	800.	16.0	173.	91.	4.	1.629	0.0277	0.0221	527.83
205	1855.	12.	53.	800.	16.0	173.	91.	5.	1.868	0.0289	0.0225	606.14
205	1855.	12.	53.	800.	16.0	173.	91.	5.	1.804	0.0283	0.0221	589.97
205	1855.	12.	53.	800.	16.0	173.	91.	5.	1.744	0.0282	0.0222	565.87
205	1855.	12.	53.	800.	16.0	173.	91.	5.	1.667	0.0274	0.0217	569.42
205	1855.	12.	53.	800.	16.0	173.	91.	5.	1.693	0.0265	0.0207	656.82
205	1855.	12.	53.	800.	16.0	173.	91.	5.	1.711	0.0276	0.0217	561.20
205	1855.	12.	53.	800.	16.0	173.	91.	5.	1.693	0.0276	0.0218	443.05
205	1855.	12.	53.	800.	16.0	173.	91.	5.	1.687	0.0276	0.0216	502.13
205	1855.	12.	53.	800.	16.0	173.	91.	5.	1.730	0.0271	0.0211	582.10
206	1858.	12.	53.	800.	16.0	173.	92.	6.	1.684	0.0288	0.0230	406.90
206	1858.	12.	53.	800.	16.0	173.	92.	6.	1.778	0.0293	0.0232	497.97
206	1858.	12.	53.	800.	16.0	173.	92.	6.	1.743	0.0291	0.0231	478.27
206	1858.	12.	53.	800.	16.0	173.	92.	6.	1.689	0.0273	0.0215	528.32
206	1858.	12.	53.	800.	16.0	173.	92.	6.	1.695	0.0265	0.0207	704.88
206	1858.	12.	53.	800.	16.0	173.	92.	6.	1.734	0.0273	0.0214	694.36
205	1858.	12.	53.	800.	16.0	173.	92.	6.	1.660	0.0296	0.0239	436.56
206	1858.	12.	53.	800.	16.0	173.	92.	6.	1.690	0.0292	0.0234	435.41
206	1858.	12.	53.	800.	16.0	173.	92.	6.	1.733	0.0294	0.0235	494.59
211	1852.	12.	41.	500.	16.0	179.	105.	1.	1.823	0.0297	0.0234	765.23
211	1852.	12.	41.	500.	16.0	179.	105.	1.	1.742	0.0290	0.0230	601.96
211	1852.	12.	41.	500.	16.0	179.	105.	1.	1.755	0.0297	0.0237	599.43
211	1852.	12.	41.	500.	16.0	179.	105.	1.	1.733	0.0290	0.0231	575.21
211	1852.	12.	41.	500.	16.0	179.	105.	1.	1.693	0.0292	0.0234	527.77
211	1852.	12.	41.	500.	16.0	179.	105.	1.	1.715	0.0292	0.0233	488.19
211	1852.	12.	41.	500.	16.0	179.	105.	1.	1.728	0.0267	0.0208	631.23
211	1852.	12.	41.	500.	16.0	179.	105.	1.	1.673	0.0268	0.0211	579.54
211	1852.	12.	41.	500.	16.0	179.	105.	1.	1.691	0.0267	0.0209	568.11
212	1858.	12.	42.	750.	16.0	179.	107.	2.	1.692	0.0281	0.0223	612.64
212	1858.	12.	42.	750.	16.0	179.	107.	2.	1.654	0.0271	0.0214	612.74
212	1858.	12.	42.	750.	16.0	179.	107.	2.	1.642	0.0286	0.0230	550.15
212	1858.	12.	42.	750.	16.0	179.	107.	2.	1.667	0.0273	0.0215	573.60
212	1858.	12.	42.	750.	16.0	179.	107.	2.	1.758	0.0265	0.0205	736.92
212	1858.	12.	42.	750.	16.0	179.	107.	2.	1.735	0.0284	0.0224	516.08
212	1858.	12.	42.	750.	16.0	179.	107.	2.	1.648	0.0270	0.0213	540.12
212	1858.	12.	42.	750.	16.0	179.	107.	2.	1.632	0.0259	0.0203	603.75
212	1858.	12.	42.	750.	16.0	179.	107.	2.	1.627	0.0278	0.0222	494.93
213	1860.	12.	43.	800.	16.0	180.	109.	3.	1.738	0.0282	0.0222	650.75
213	1860.	12.	43.	800.	16.0	180.	109.	3.	1.690	0.0266	0.0208	635.99
213	1860.	12.	43.	800.	16.0	180.	109.	3.	1.673	0.0268	0.0211	657.86
213	1860.	12.	43.	800.	16.0	180.	109.	3.	1.708	0.0271	0.0212	505.51
213	1860.	12.	43.	800.	16.0	180.	109.	3.	1.791	0.0266	0.0205	572.39
213	1860.	12.	43.	800.	16.0	180.	109.	3.	1.699	0.0276	0.0218	561.20
213	1860.	12.	43.	800.	16.0	180.	109.	3.	1.667	0.0285	0.0228	512.47
213	1860.	12.	43.	800.	16.0	180.	109.	3.	1.696	0.0279	0.0221	433.58
213	1860.	12.	43.	800.	16.0	180.	109.	3.	1.672	0.0264	0.0207	581.10
214	1863.	12.	46.	800.	16.0	179.	110.	4.	1.723	0.0294	0.0235	520.62
214	1863.	12.	46.	800.	16.0	179.	110.	4.	1.680	0.0293	0.0235	524.18
214	1863.	12.	46.	800.	16.0	179.	110.	4.	1.655	0.0292	0.0235	606.94

Table 1B (Continued)

214	1863.	12.	46.	800.	16.0	179.	110.	4.	1.684	0.0292	0.0234	448.61
214	1863.	12.	46.	800.	16.0	179.	110.	4.	1.635	0.0295	0.0239	465.38
214	1863.	12.	46.	800.	16.0	179.	110.	4.	1.668	0.0294	0.0237	481.57
214	1863.	12.	46.	800.	16.0	179.	110.	4.	1.700	0.0291	0.0233	478.27
214	1863.	12.	46.	800.	16.0	179.	110.	4.	1.635	0.0287	0.0231	409.74
214	1863.	12.	46.	800.	16.0	179.	110.	4.	1.652	0.0292	0.0235	488.19
215	1865.	12.	50.	800.	16.0	180.	110.	5.	1.699	0.0293	0.0235	497.97
215	1865.	12.	50.	800.	16.0	180.	110.	5.	1.683	0.0283	0.0225	561.88
215	1865.	12.	50.	800.	16.0	180.	110.	5.	1.678	0.0286	0.0228	508.89
215	1865.	12.	50.	800.	16.0	180.	110.	5.	1.660	0.0287	0.0230	491.69
215	1865.	12.	50.	800.	16.0	180.	110.	5.	1.653	0.0290	0.0233	508.32
215	1865.	12.	50.	800.	16.0	180.	110.	5.	1.673	0.0285	0.0228	498.62
215	1865.	12.	50.	800.	16.0	180.	110.	5.	1.660	0.0290	0.0233	481.57
215	1865.	12.	50.	800.	16.0	180.	110.	5.	1.626	0.0293	0.0237	497.97
215	1865.	12.	50.	800.	16.0	180.	110.	5.	1.594	0.0283	0.0228	463.55
216	1865.	12.	50.	800.	16.0	180.	112.	6.	1.705	0.0288	0.0230	515.41
216	1865.	12.	50.	800.	16.0	180.	112.	6.	1.660	0.0269	0.0212	559.69
216	1865.	12.	50.	800.	16.0	180.	112.	6.	1.630	0.0291	0.0235	398.55
216	1865.	12.	50.	800.	16.0	180.	112.	6.	1.702	0.0292	0.0234	554.16
216	1865.	12.	50.	800.	16.0	180.	112.	6.	1.690	0.0289	0.0231	484.91
216	1865.	12.	50.	800.	16.0	180.	112.	6.	1.655	0.0261	0.0204	693.62
216	1865.	12.	50.	800.	16.0	180.	112.	6.	1.685	0.0276	0.0218	505.51
216	1865.	12.	50.	800.	16.0	180.	112.	6.	1.668	0.0264	0.0207	613.38
216	1865.	12.	50.	800.	16.0	180.	112.	6.	1.635	0.0260	0.0204	599.11
301	1613.	6.	38.	800.	16.0	177.	90.	1.	1.700	0.0309	0.0251	435.95
301	1613.	6.	38.	800.	16.0	177.	90.	1.	1.690	0.0292	0.0234	461.80
301	1613.	6.	38.	800.	16.0	177.	90.	1.	1.703	0.0302	0.0244	431.72
301	1613.	6.	38.	800.	16.0	177.	90.	1.	1.702	0.0302	0.0244	431.72
301	1613.	6.	38.	800.	16.0	177.	90.	1.	1.714	0.0276	0.0217	472.59
301	1613.	6.	38.	800.	16.0	177.	90.	1.	1.661	0.0291	0.0234	411.84
301	1613.	6.	38.	800.	16.0	177.	90.	1.	1.699	0.0303	0.0245	355.36
301	1613.	6.	38.	800.	16.0	177.	90.	1.	1.774	0.0298	0.0237	392.72
301	1613.	6.	38.	800.	16.0	177.	90.	1.	1.759	0.0294	0.0234	403.48
302	1621.	6.	33.	810.	16.0	178.	90.	2.	1.677	0.0272	0.0214	486.59
302	1621.	6.	33.	810.	16.0	178.	90.	2.	1.738	0.0291	0.0231	438.41
302	1621.	6.	33.	810.	16.0	178.	90.	2.	1.714	0.0296	0.0237	423.72
302	1621.	6.	33.	810.	16.0	178.	90.	2.	1.674	0.0288	0.0231	406.90
302	1621.	6.	33.	810.	16.0	178.	90.	2.	1.681	0.0296	0.0238	385.20
302	1621.	6.	33.	810.	16.0	178.	90.	2.	1.668	0.0298	0.0241	215.36
302	1621.	6.	33.	810.	16.0	178.	90.	2.	1.669	0.0303	0.0246	245.07
302	1621.	6.	33.	810.	16.0	178.	90.	2.	1.722	0.0316	0.0257	236.59
302	1621.	6.	33.	810.	16.0	178.	90.	2.	1.739	0.0295	0.0235	206.84
303	1630.	6.	27.	820.	16.0	176.	90.	3.	1.659	0.0292	0.0235	369.44
303	1630.	6.	27.	820.	16.0	176.	90.	3.	1.665	0.0314	0.0257	296.67
303	1630.	6.	27.	820.	16.0	176.	90.	3.	1.706	0.0314	0.0255	296.67
303	1630.	6.	27.	820.	16.0	176.	90.	3.	1.670	0.0312	0.0255	254.25
303	1630.	6.	27.	820.	16.0	176.	90.	3.	1.649	0.0309	0.0252	271.00
303	1630.	6.	27.	820.	16.0	176.	90.	3.	1.652	0.0315	0.0258	204.08
303	1630.	6.	27.	820.	16.0	176.	90.	3.	1.670	0.0325	0.0268	223.67
303	1630.	6.	27.	820.	16.0	176.	90.	3.	1.709	0.0333	0.0274	202.91
303	1630.	6.	27.	820.	16.0	176.	90.	3.	1.679	0.0324	0.0266	171.47
304	1610.	6.	26.	800.	16.0	176.	90.	4.	1.664	0.0303	0.0246	355.36
304	1610.	6.	26.	800.	16.0	176.	90.	4.	1.690	0.0306	0.0248	396.48
304	1610.	6.	26.	800.	16.0	176.	90.	4.	1.715	0.0316	0.0257	292.92
304	1610.	6.	26.	800.	16.0	176.	90.	4.	1.710	0.0319	0.0260	232.16
304	1610.	6.	26.	800.	16.0	176.	90.	4.	1.708	0.0307	0.0248	322.28
304	1610.	6.	26.	800.	16.0	176.	90.	4.	1.685	0.0322	0.0264	173.60
304	1610.	6.	26.	800.	16.0	176.	90.	4.	1.728	0.0318	0.0259	200.25
304	1610.	6.	26.	800.	16.0	176.	90.	4.	1.693	0.0319	0.0261	210.05
304	1610.	6.	26.	800.	16.0	176.	90.	4.	1.630	0.0316	0.0260	236.59
305	1605.	6.	25.	815.	16.0	177.	90.	5.	1.690	0.0290	0.0232	307.67
305	1605.	6.	25.	815.	16.0	177.	90.	5.	1.689	0.0280	0.0222	487.88
305	1605.	6.	25.	815.	16.0	177.	90.	5.	1.665	0.0271	0.0214	444.23
305	1605.	6.	25.	815.	16.0	177.	90.	5.	1.699	0.0309	0.0251	282.78

FIRST QUARTERLY REPORT
FOR
STUDY OF PROCESS VARIABLES ASSOCIATED
WITH MANUFACTURING HERMETICALLY-SEALED
NICKEL-CADMIUM CELLS

BY

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FEBRUARY 23 THROUGH MAY 23, 1970

CONTRACT NUMBER NAS5-21159

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ABSTRACT

This report describes the first phase of experiments designed to determine the critical process variables in the manufacturing of aerospace nickel-cadmium cells. This first phase was devoted to the dry-sintering process for manufacturing porous nickel plaques.

The results presented here are the effects of sintering time and temperature, atmosphere composition and cooling method. The plaques were characterized by thickness, porosity, free volume, strength and weight. Unit weight, thickness and strength were also taken to determine uniformity within each plaque as well as from plaque-to-plaque.

I. INTRODUCTION

The objective of this program is to develop a process procedure and control for manufacturing nickel-cadmium aerospace cells with reliable five (5) year life capability. In order to achieve these objectives, each component part will be investigated separately and collectively to determine the critical variables and related interactions.

The total program consists of four (4) distinct, yet interrelated phases. The first phase consists of a detailed analysis of our procedures in conjunction with a review of pertinent literature of nickel-cadmium batteries to assess critical variables of the various processes that affect cell performance. The second phase will involve the evaluation and testing (verification) of the variables and their interrelation as determined in Phase 1. This will include a design of experiments to experimentally identify critical variables and to establish tolerances required for uniform performance. Phase 3 includes the detailed preparation of a Quality and Reliability Assurance Program, Acceptance and Manufacturing Flow Sheets and a complete specification similar to Specification Number S-716-P-23, Interim Model Specification for High Reliability Nickel-Cadmium Spacecraft Cells. The Fourth Phase of the program will be to implement the results of Phases 1 through 3 on a production basis. This effort will "prove out" the conclusions and will establish both validity of concept and applicability to production equipment and overall operational capability. During this phase, the deliverable items of separation, positive and negative plates will be prepared. Also, 20 nickel-cadmium cells of 20 ampere-hour size will be manufactured to the developed procedure. Inspection levels will be 100% minimum and complete traceability maintained.

The first quarter of this program has been devoted to investigating the dry-sintering process used in manufacturing porous nickel plaque. A factorial experiment was designed to examine the sintered plaque characteristics as a function of the process variables. The data gathered from this experiment were analyzed using a step-wise multiple regression technique designed for use with the IBM 1130 computer. At the completion of analysis, plaques with different characteristics will be selected for use in the impregnation factorial experiment. After the impregnation study, these plaques will be characterized both electrically and physically to determine the effects of sintering and impregnation variations. Tolerance limits will be selected and plates will be produced for a production lot of cells. Studies will also be conducted on other component parts, such as, separators, ceramic-to-metal seals, welding techniques, etc. At the completion of these component studies, cells will be built and investigated for such things as electrolyte amount, positive-negative ratio, compression, etc. The cells produced at the completion of the program will be placed on Life Cycle Testing and cycled to failure.

II. DRY SINTERING EXPERIMENT

A. Dry Sintering Process

The dry or loose sintering process consists of sieving Carbonyl Nickel Powders (INCO 287) into a pre-set mold which contains the nickel-supporting grid. The powder is then leveled and transferred to an Inconel sheet. The raw plaque which is 10.5 x 9.5 inches is then passed through the sintering furnace on the Inconel sheet. Figure 1 is a standard raw plaque.

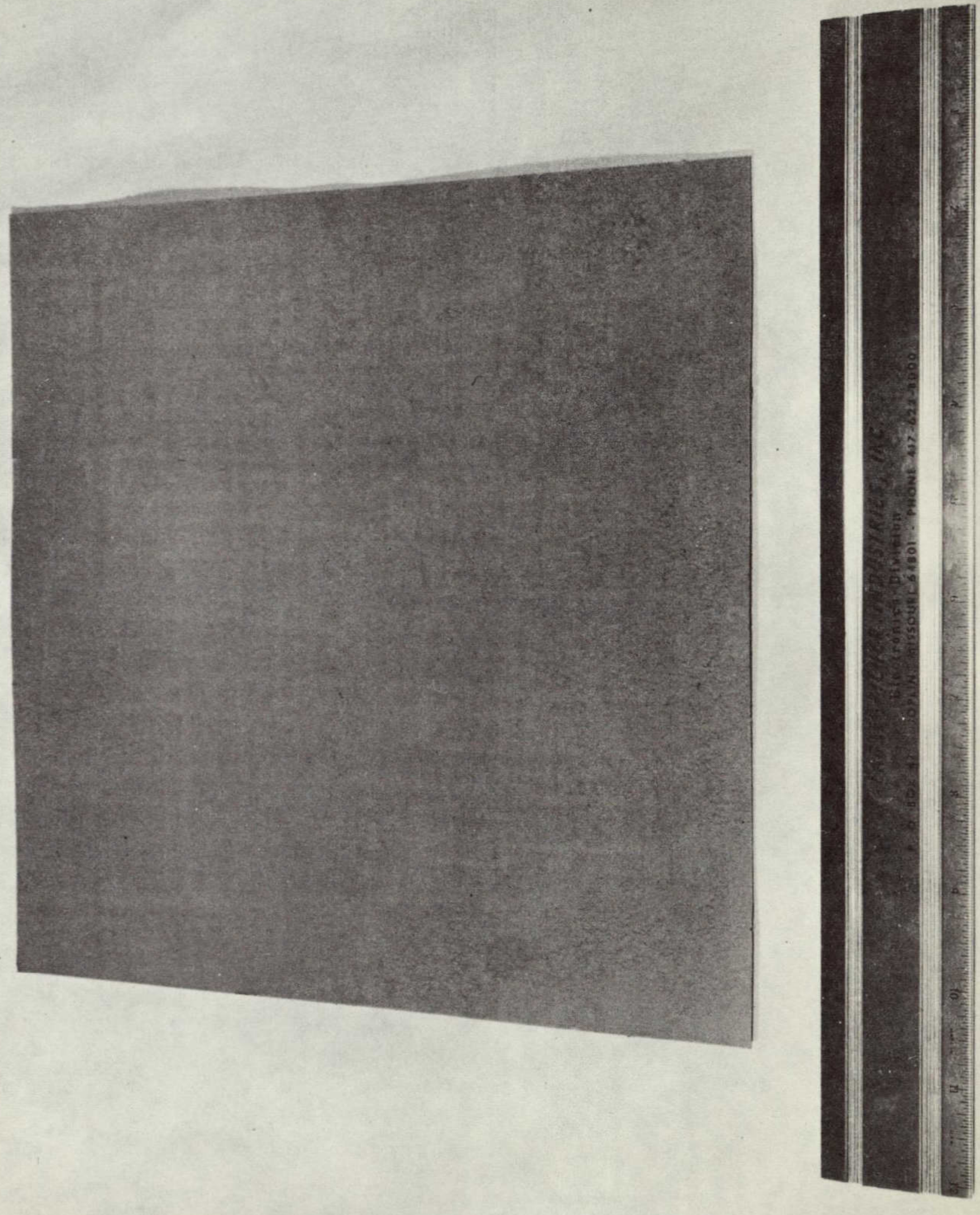


FIGURE 1

STANDARD RAW PLAQUE

B. Program Plan

A designed experiment was conducted to obtain information on the effect of production parameters and error variance. This design was of a sequential series type using seven (7) variables. The seven (7) variables require eight (8) tests for main effect evaluation and in order to obtain error variance determinations, five (5) replicates were run making a total of 13 tests. The tests were randomized as to their order and every effort was made to prevent any level of a variable from simply carrying over from its previous level into the next test. The levels and designations are shown in Table I, while the plan is shown in Table II. All the variables were measured and the actual numbers, not the design levels, were used in the analysis.

The main effect tests were the four (4) corners and center of the full factorial with a random selection of the other trials. The replicates were the four (4) corners and center.

TABLE I

VARIABLES AND DESIGNATION OF THE LEVELS

VARIABLES	LEVEL AND DESIGNATION
1. Temperature	1600 = -1; 1850 = +1, Degrees F
2. Belt Speed	6 = -1; 12 = +1, Inches/Minute
3. Dewpoint	25 = -1; 50 = +1, Degrees F
4. Atmosphere Amount	400 = -1; 800 = +1, Cubic Feet/Hour
5. Bulk Density	Measured, .870 ± .006 gms/cc
6. Plaque Spacing	0 = -1; 16 = +1, Inches
7. 1st Cooling Zone	75 = -1; 175 = +1, Degrees F

TABLE II

DESIGN OF EXPERIMENT WITH

VARIABLES IN ORDER

TRIAL NUMBER	VARIABLES						
	1	2	3	4	5	6	7
1	-1	-1	-1	-1	-1	-1	-1
2	+1	+1	+1	+1	+1	+1	+1
3	-1	-1	-1	+1	+1	+1	+1
4	+1	+1	+1	-1	-1	-1	-1
5	+1	-1	+1	-1	+1	-1	+1
6	+1	-1	-1	+1	+1	-1	-1
7	-1	+1	+1	+1	-1	+1	+1
8	+1	-1	+1	-1	-1	+1	-1
9	-1	-1	-1	-1	-1	-1	-1
10	+1	+1	+1	+1	+1	+1	+1
11	-1	-1	-1	+1	+1	+1	+1
12	+1	+1	+1	-1	-1	-1	-1
13	+1	-1	+1	-1	+1	-1	+1

C. Sintering Experiment

The sintering experiments were carried-out on a furnace located at Eagle-Picher's Colorado Springs Facility (See Figure 2). The sintering furnace has a maximum temperature capability of 2000°F and a belt speed of 22 inches per minute. The furnace temperature was controlled by sensing the temperature from two (2) thermocouples located four (4) inches above the belt in two (2) locations. The belt speed was controlled by adjusting the drive motor speed. The furnace has a controlled atmosphere which is produced by cracking natural gas in an endothermic generator. The composition of this gas is adjusted by the gas-to-air ratio in the generator and measured by its dewpoint using an Alnor Dewpointer Type 7000/U. The amount of atmosphere in the furnace is controlled by the input valve and associated flow meter. The furnace has two (2) cooling chambers each with its own temperature control. The temperature of the cooling zone is maintained by a temperature sensitive valve which varies the amount of water flowing through the water jackets.

Six (6) plaques were made with each test. Each plaque was sampled in nine (9) places as shown in Figure 3. Each sample is 1" x 2" and was cut using a standard punch and die set mounted on an Arbor Press (See Figure 4).

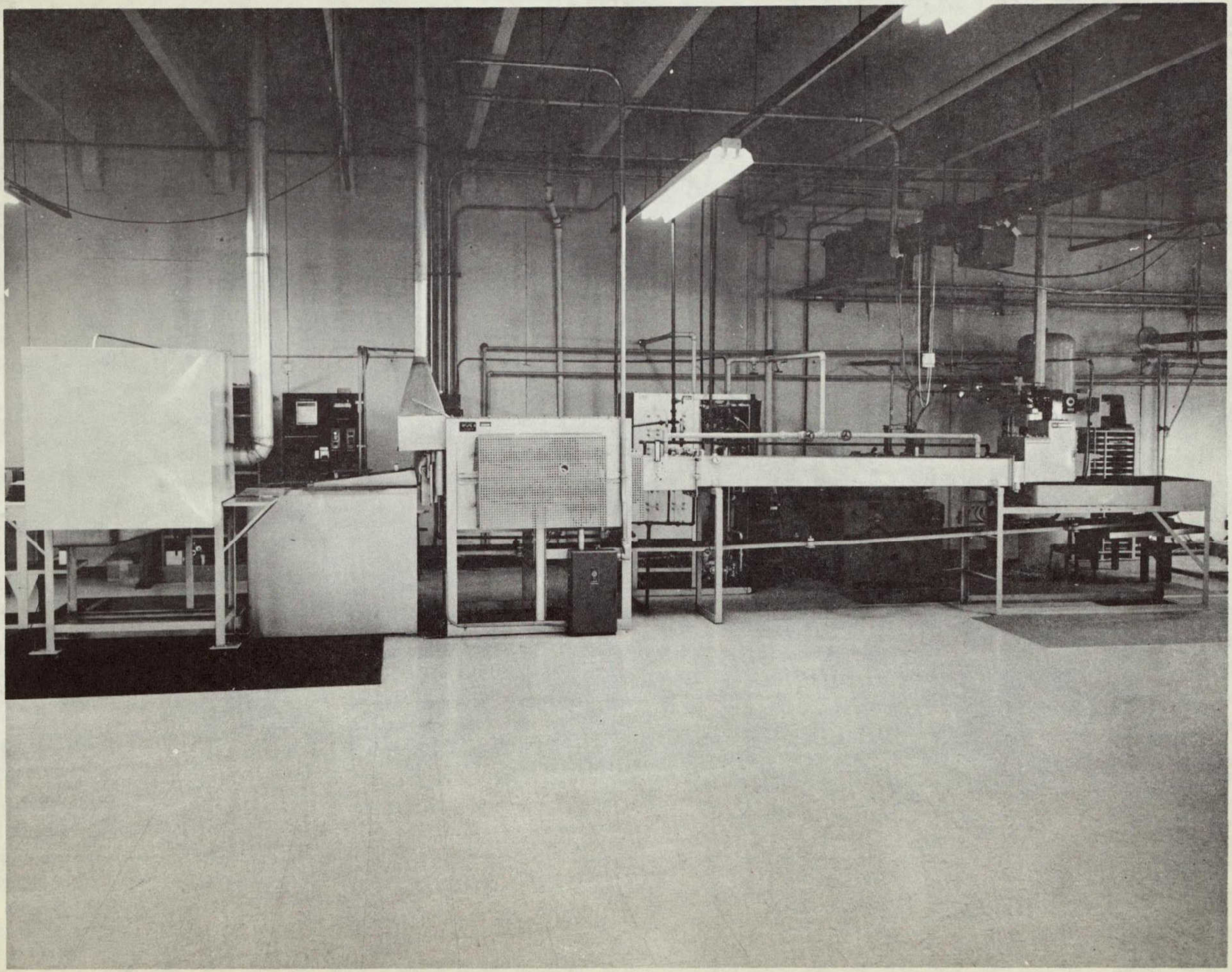
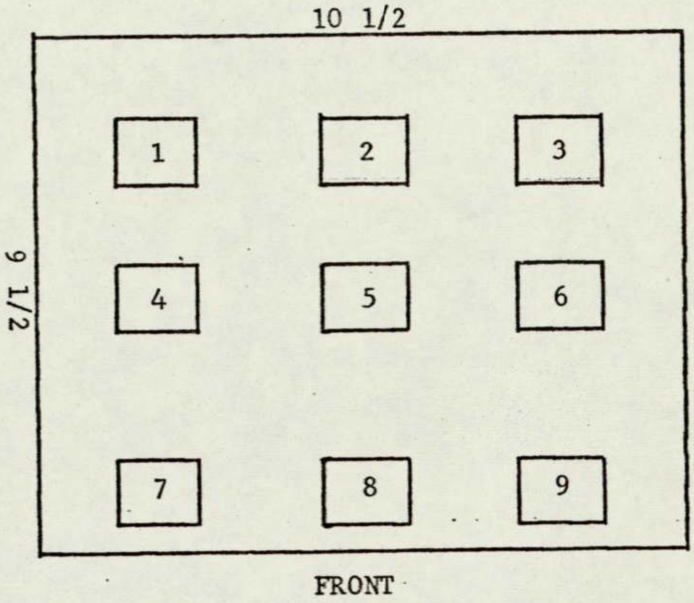


FIGURE 2
SINTERING FURNACE

FIGURE 3



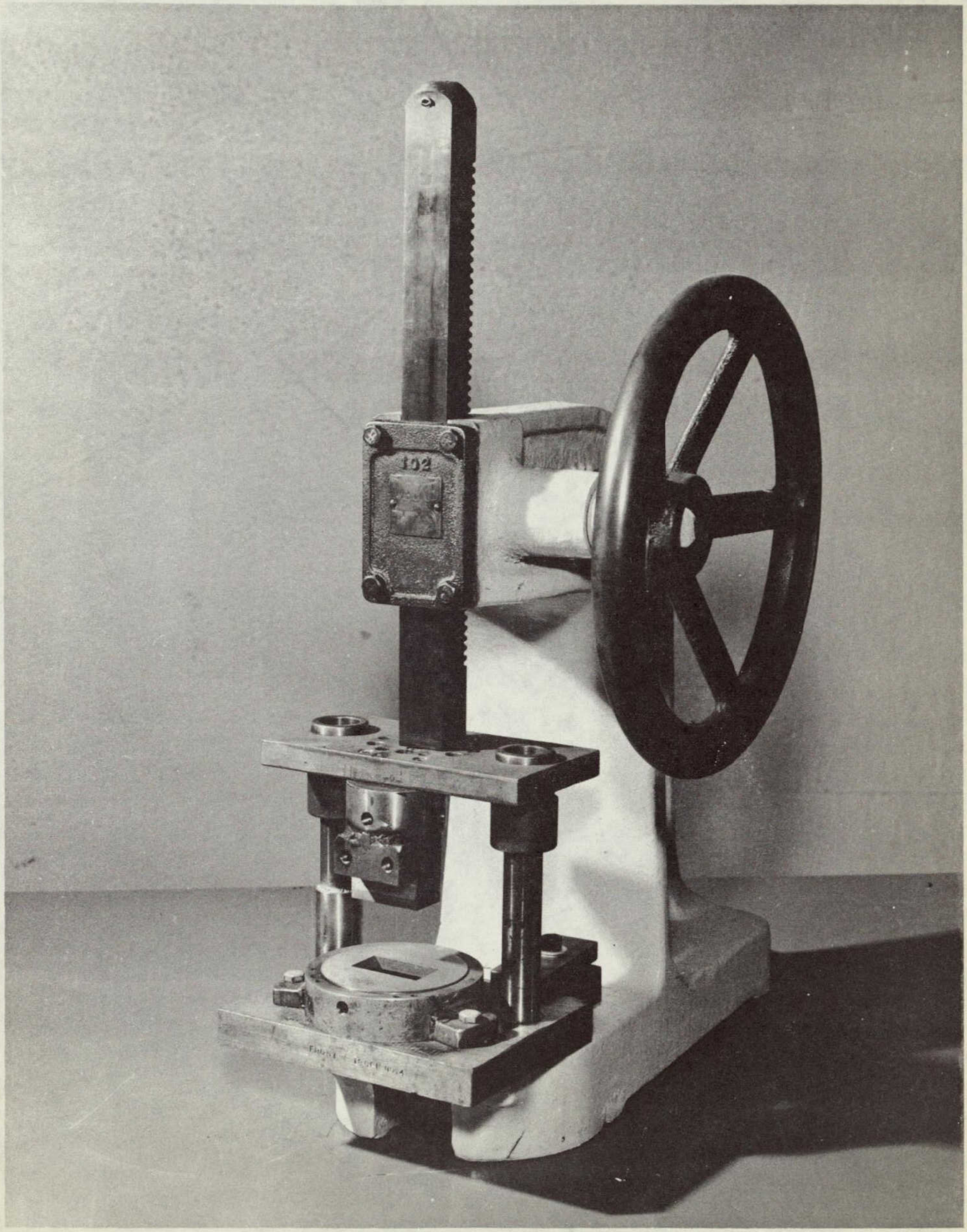


FIGURE 4
ARBOR PRESS

The samples were then weighed on a RX-1 Torsion Balance (The Torsion Balance Company, Clifton, New Jersey) and the thickness measured using a AS 1141C Exact Micrometer (E. J. Cady & Company, Chicago, Illinois). The free volume was then calculated by the following equation:

$$V_F = T - \frac{W}{2d}$$

Where: V_F = Free Volume in Cu.In./Sq.In.

T = Thickness

W = Weight of Sample

d = Density of Nickel in Gms/Cu.In.

The mechanical strength of each sample was measured using a Four-Point Bend Testing Machine constructed at Eagle-Picher. The bending jig and method of obtaining mechanical strength of porous nickel plaques were developed under Contract Number NAS5-11561 by Tyco Laboratories, Inc., Waltham, Massachusetts.[(1)] Figure 5 shows the completed assembly and Figure 6 shows the bending jig. The bending jig is mounted to a standard ball bearing die set to provide a friction free perpendicular movement with a controlled side-loading. The die set is equipped with a compression load cell of a 25 pound range and a load meter with an amplifier (Bytrex, Inc., Waltham, Mass.). The die set is driven with a hardened lead screw with 16 threads per inch and a reciprocating ball nut to provide a friction free advance. This is coupled to a 10 rpm motor capable of producing 36 inch pounds of thrust at the Four-Point Bend Tester. The reciprocating ball nut is adjustable to eliminate slack in the lead screw arrangement.

The samples were placed on the lower circular pins shown in Figure 6 and a compressive load applied by the upper circular pins. Figure 7 shows a typical load trace.

The mechanical strength was calculated using the following formula:

$$\sigma = .75 \frac{PL}{bh^2}$$

Where: σ = Stress (psi)

P = Load (lbs)

L = Distance Between Outer Supports (1.5 inches)

b = Width of Sample (1.0 inch)

h = Thickness of Sample

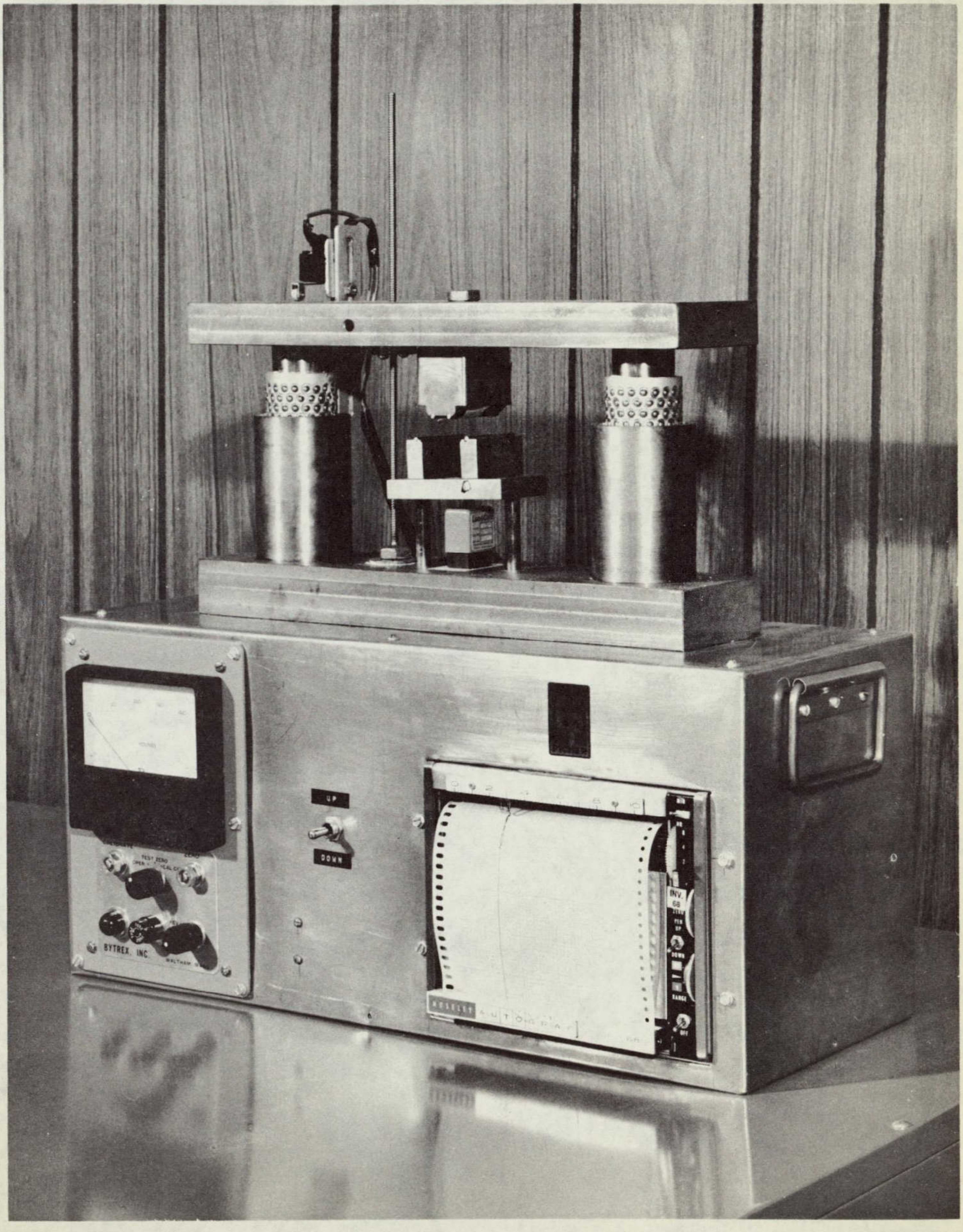


FIGURE 5
FOUR POINT BEND TESTER

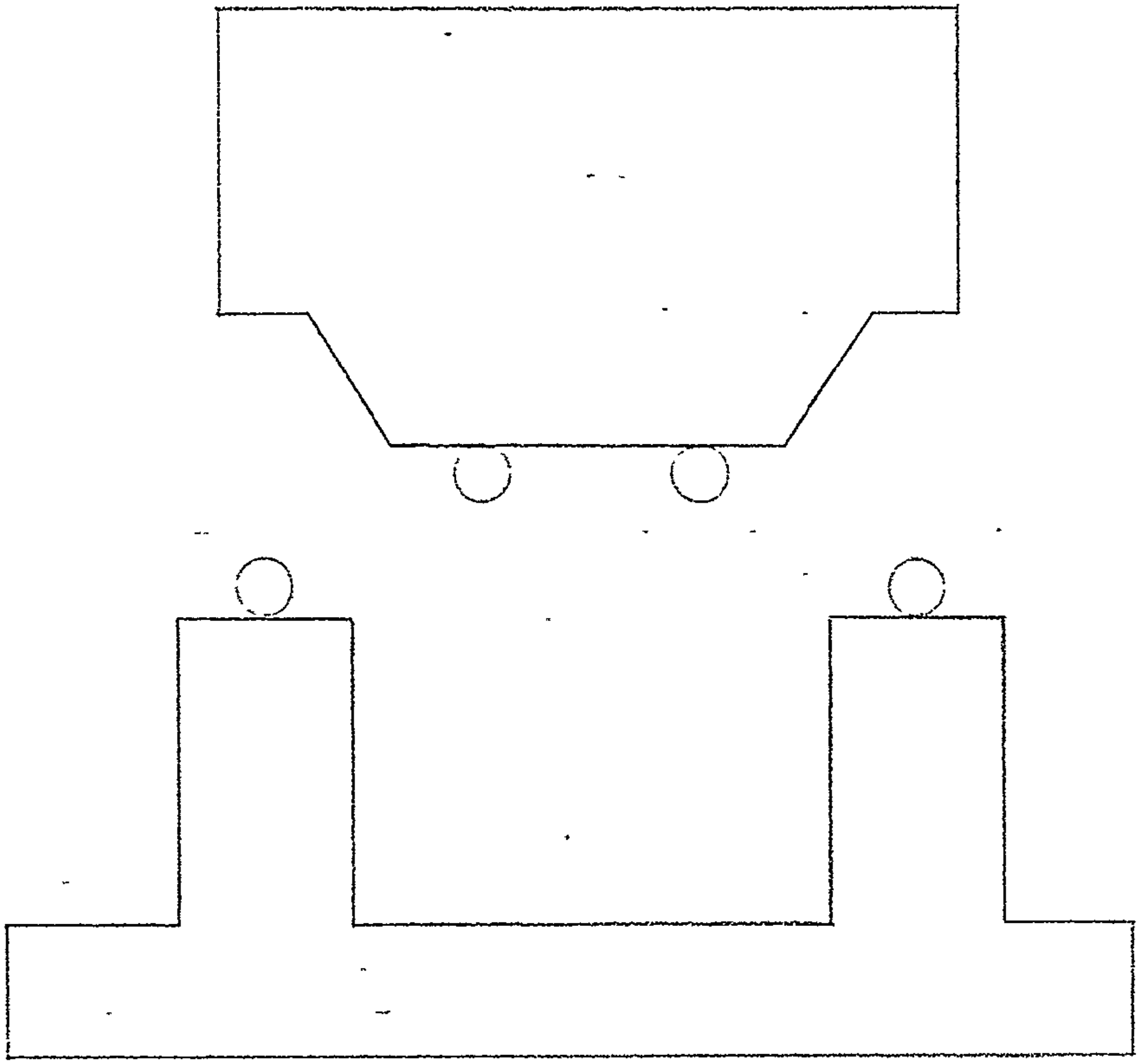


FIGURE 6

BENDING JIG

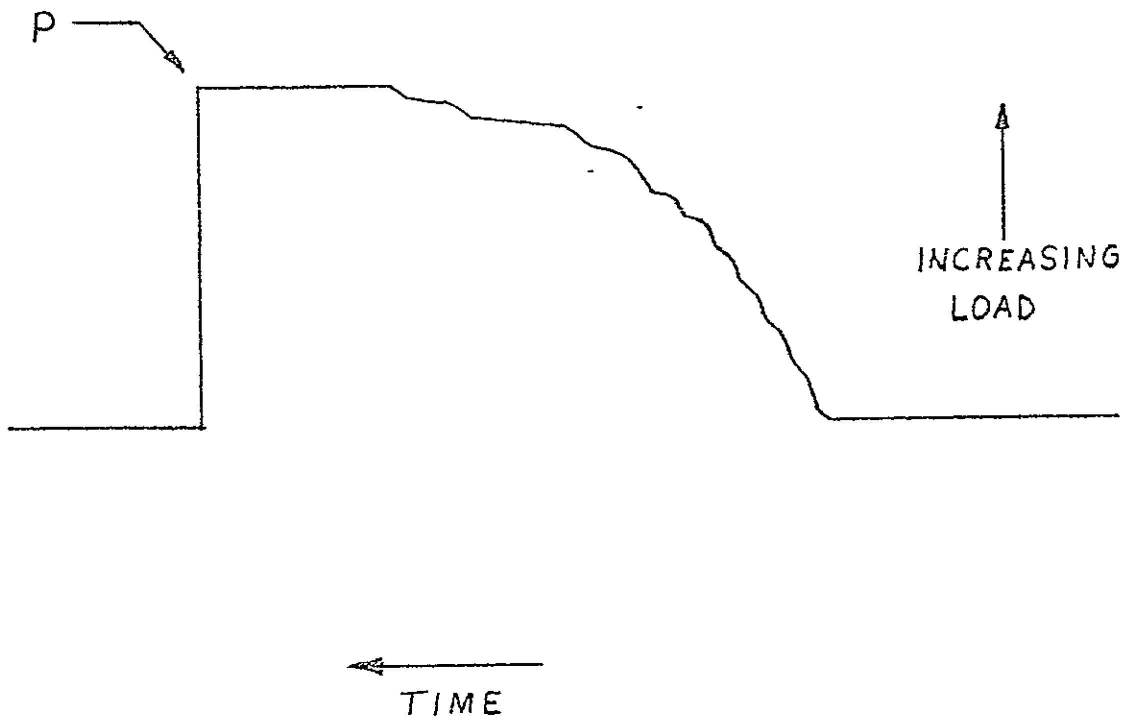


FIGURE 7

TYPICAL LOAD TRACE

III. DATA ANALYSIS

A. Introduction

Each "observation" in the plan, discussed in the previous section, consisted of data on six (6) plaques per test. Each plaque had nine (9) sample results, thus, approximately 700 observations were available. The "pure" replicates were the nine (9) samples within each plaque. Some variation in the independent or controlled variable matrix was observed and these were used in the matrix as such. The sequence of the six (6) plaques going through the furnace was added to the matrix. Only one (1) lot of nickel powder was used and no change in bulk density was found through the whole plan,[1] so this variable was replaced by the plaque sequence. There were two (2) cooling zones and the temperature from each was put into the matrix. The weight of the two (2) sq.in. sample was used as a variable when regressing for the thickness response and the thickness (actual) was used when regressing for void and strength responses. Void per sq.in. of surface was considered a more pertinent and meaningful response when porosity percentage, therefore, porosity was replaced by void in the matrix. Void represents the actual volume available for active material and requires knowledge of the thickness of the particular plaque. Void is an absolute quantity in units of cu.in. per sq.in. plaque.

A total of nine (9) variables were used in the independent variable matrix ($\mathcal{X}$) for each response. Table 1A, in the Appendix, lists the column designations and Table 1B lists the original data with the response computed for each observation.

B. Interpretation - ANOVA (Analysis of Variance)

Although multiple regression analysis is not dependent on information from an analysis of variance, obtaining the pure error sum of squares from an ANOVA is useful. The residual sum of squares from a regression includes the error sum of squares along with any sum of squares due to interaction or variable terms not included in the model, but should be, provided sufficient degrees of freedom are available. In order to obtain information for this use, an analysis of variance was performed. Tables 2, 3 and 4 show the ANOVA information treating each set of plaque samples (A), each distinct set of plaques (B) and combining the "replicate" sets as a group (C). From the ANOVA information, a high significance is concluded from the "F" value comparisons for the effect of combined variables, as well as showing the replication or pure error (within groups) sums of squares.

C. Interpretation - Regression

The variable designation for the various regressions are listed in the Appendix for each response; Strength, Table 5A; Void, Table 6A; Thickness, Table 7A. The initial regression for each response (Tables 5B, 6B and 7B) was including the main effects only without any interaction terms in the model. For ease of comparison, a coding routine was used in which the maximum value of each variable is set equal to +1 and the minimum value is set to -1. All intermediate values are prorated between these two (2) values. The printouts show the maxima and minima for all variables except the response

which is unchanged. For all three (3) responses, the regressions without interactions show the existence of interactions through the regression sum of squares being appreciably larger than the corresponding pure error sum of squares (within plaques).

A note should be added here on a fundamental aspect of interpretation with multiple regression concerning confounding. It was originally thought that a (X) variable vector having a correlation coefficient other than 1 with another (X) variable vector regardless of what the vector is would not be confounded. Dr. Leroy Folks, Statistics Department, Oklahoma State University, Stillwater, Oklahoma,[2] has started a fundamental analysis of this problem. Although the study is not complete, Dr. Folks opinion at this time is that a factor (vector) that has a correlation coefficient other than zero includes in its regression coefficient some of the effects of the partially correlated vectors and probably vice versa. However, use of the model for predictions and comparison of "pure" replication error with residual error is not affected.

In order to locate and obtain the regression equation with the interactions in the model, a series of regressions were made, always using the same basic nine (9) variable matrix. The regression program being used can handle 36 variables in the X matrix (37 = response). Since there are 36 first order interactions possible from nine (9) variables, two (2) regression runs were necessary. Coding for the interactions was accomplished by applying the +1 and -1 code to the range of values for the product of the raw variables as a vector. In this manner, a low (minus) code is the result of two (2) low level base variable and a high (plus)

code is the result of the high level products. Low significance or zero magnitude interactions were replaced with the untried interactions for the second and final regression which is shown in Tables 5C, 6C and 7C for each response. These "C" regressions were used for further interpretation using the same maximum and minimum for coding the prediction levels desired.

It is important to note that when a set of levels are selected that predict above or below the responses in the original data, this constitutes an extrapolation subject to all the restrictions and hazards of graphical extrapolation. With the complexity of the interactions in these results, it is difficult to optimize and at the report closure time, final interpretation is not considered complete. The discussion to follow will concern the "current" method being pursued.

In order to obtain a more complete view of the entire factor space, a computer generated full factorial set of levels (512) along with the predictions of all three (3) responses was built. A sort and rearrangement program was performed on each response while simultaneously carrying the matrix, void and strength for each. A set of values was obtained for the highest void x strength product. The original sets are shown in Table 8B and the variable designations are in Table 8A. No special attention was paid to the "desirable" levels in the X matrix at this stage. The first variable that was studied was Plaque Sequence, using only the 6th plaque in each test. Table 8C shows the effect of a change of all levels 1 to 6.

Table 8D shows the effect of belt speed when it is increased from 6 in./min. to 12 in./min. Finally, the effect of changing the plaque spacing to its smallest value in place of 16 inches is shown in Table 8E. In each case, the thickness is uniformly the highest value, .034", so the void and strength are directly comparable without compensating for differences in thickness. Since thickness did vary in the original data, this direct comparison cannot be precisely made. The reason for observing the effect of changing the levels to those shown is that, in all cases, the levels were changed in the direction of increased production. Only one (1) prediction (Obs. 7) remained the same (no substitution) and another (Obs. 8) was improved slightly (to equal Obs. 7). The other predictions all lost strength with slight changes in void.

An effort was made to optimize a set of levels assuming linearity between level bounds within linear factors and all interactions. This was done by selecting all sets with a void x strength product greater than 100 from the factorial and regressing these against the simple factor matrix to find a "high" set. Table 9A shows the data used for the full factorial prediction set. Variable designations follow Table 6A for the first nine (9) columns, followed by the predicted void and strength.

Using coded limits, as in the regressions in Table 6, Tables 9B and 9C are the regressions for void and strength, respectively. Table 9D contains the predictions from the original regression (Tables 5 and 6) for the levels shown. This confirms the general observation that a plaque may have a good void and either be high or low in strength.

While the interpretation was under way, a mid-level test was conducted to observe whether predictions would be reliable with mid-levels, assuming linearity of effects and to ultimately add these observations to the basic data matrix for prediction. Only the former has been accomplished as of this report. Table 10A shows a listing of the mid-level data using the variable designation of Table 1A. Table 10B shows a listing of the actual void and strength versus the predicted values using Tables 5 and 6 regressions. The predicted strength is not in good agreement with the actual strength although the predicted strength is well above an acceptable range. The predicted strength is 658 pounds versus an actual strength of 554 pounds with corresponding sigmas of 33 versus 49. The void prediction is in much better agreement. The mean predicted void is 0.0227 cu.in./sq.in. versus the actual 0.02222 cu.in./sq.in. void with corresponding sigmas of 0.063 vs. 0.061 respectively. The correlation coefficients of predictions versus actual for void was .923 while strength was .387 (N = 54). Analysis of the pure replication error variance will be made in the treatment of possible improvement in the production sigmas.

Additional interpretation with the mid-level test included in the data matrix is necessary before an overall appreciation of the possible directions that may result in a more uniform plaque can be obtained.

No interpretation has been made using porosity as a response, since it was the consensus that void was a more meaningful parameter. However, porosity does measure the degree to which the void per unit thickness (volumn) has been altered by the experimental parameters. This type of analysis will be included in the more detailed interpretation now underway.

D. Interpretation: Variability of the Process

The problem of measuring and proposing corrective action toward decreasing the variability of the plaques is essentially a separate interpretation. Two (2) types of measurement data may be utilized:

(1) Analysis of variance data.

(2) Slope information from the regressions, combined with observed variation within the (X) matrix.

Using an analysis of variance, the square root of the mean square ("MS" in Tables 2, 2.1, 3 and 4) may be used as an estimate of sigma. The "within groups" ms using the plaque groups in Tables 2A, etc., yields an estimate of the "pure" error and assumes the variations within the (X) matrix variables will not cause any variation across the plaque. This variability represents combined errors from such sources as experimental error in actual measurements of thickness, weight and strength, and variations across the plaque due to weight per square inch not being uniform, etc. This type of error is separated from variations due to furnace variables not being held constant by subtracting the "within groups" SSQ and degrees of freedom from the next set of groupings. A complete analysis of variance table has been constructed for weight, thickness, void and strength using the original set of data in Tables 12A, B, C and D. This analysis of

variance is shown in Tables 2, 2.1, 3 and 4. The terminology used in the "source" column is defined in Table 12A. Variability of the responses may, of course, apply individually to each. In the ANOVA detail source, the variability within each plaque ("within plaques") is considered to be "pure error". "Within runs between plaques" or "within runs" would show variability with a new setting of furnace and a restart in plaque preparation. "Within groups between groups" and "within groups" would show variability with the test levels changed to factor settings. The "between group" shows the variability due to all factors. It is expected that there would be an increase in variability between tests and groups due to a complete new set of holding levels.

The interpretation of calculations in Table 12 is best done by response.

(1) Weight/2 Sq.In.

It is difficult to consider the weight being influenced by furnace parameters or how often the furnace starts up. There is a statistically significant increase in variability during each operation and more when the parameters are changed. Comparing the coefficient of variations, this increase due to furnace changing is relatively small as compared to variation across the plaque ("within plaques"). As noted before, this error includes the experimental error of measurement as well as true variation in weight. The pooled factor effect ("between groups") is insignificant. In production, the value of variability probably would approach the "within runs" value in the "accumulative ANOVA" Table.

(2) Thickness x 10

From the regression analysis, it is known that thickness is largely determined by the weight but factor effects are very significant. The ANOVA shows somewhat more "pure" error than for weight, the coefficient of variation is 3.59%versus 2.15% respectively. This is probably due to the experimental error of measurement being larger. This is reflected parallel to weight except the pooled factor effects are much larger. Similar to weight, the principal location of variability is within the plaque itself. There was also a significant change in overall thickness between tests, but this is small as compared to the variability across the plaque (4.20%-3.59%).

(3) Void x 10 and Strength x .01

Parallel statements to thickness can be made about void and strength. The increase in variability within tests can be due to variation among the $\mathcal{X}$ or controlled variables beyond the degrees of control existing. This may be taking place simutaneously with variability originating from the variation in weight (leading to thickness, void and strength).

In order to assess the variability due to the $\mathcal{X}$ variables, the slopes may be obtained by partial differentiation of each regression equation of each response with respect to each controlled variable separately. Without such complex interaction sets, this can normally be done from the coefficients directly. The differentiation totals at least 5 to 7 terms. Both maximum and minimum slopes are given in

Tables 13A, B and C. These slopes times the fraction of uncontrolled range yields a qualitative estimate of the relative possible range of variation. The ranges subject to adjusting control and those that are fixed are shown as follows:

VARIABLE	RANGE	% OF MEAN THICKNESS RANGE	% OF MEAN VOID RANGE	STRENGTH RANGE
Var(1) Temperature	±15°; 10.2%	36.7%	29.8%	-20.3%
Var(2) Belt Speed	Fixed	--	--	--
Var(3) Dewpoint	±5°; 29.5%	64.9%	24.8%	106%
Var(4) Atmosphere	±10, 4.5%	8.75%	0.53%	17.3%
Var(5) Plaque Spacing	±.25", 3.1%	8.6%	1.0%	16.2%
Var(6) 1st Cooling Zone	±3°, 2.78%	2.7%	0.43%	3.5%
Var(7) 2nd Cooling Zone	None Observed	--	--	--
Var(8) Plaque Sequence	Fixed	--	--	--
Var(9) Weight	Fixed	--	--	--

As far as is presently known, no confirmation of this interpretation can be made, but it appears that Dewpoint would be the most important variable to obtain tighter controls over to minimize variations followed by temperature and atmosphere amount.

E. Interpretation - Mid-Level Test (No. 9)

The ANOVA information on the mid-level test (#9) is shown in Tables 11A, B, C and D.

The "within groups" (Pure error) mean square values of Test No. 9 (Table 11) may be compared with those of the original data (Tables 2, 2.1, 3 and 4), taking into account the proper degrees of freedom to show whether there is a significant difference by an "F" test.

The variability of this mid-level run is significantly less than the first tests in the series, as shown in Table 14 where the numerator in the ratio of mean squares is the earlier tests.

Further interpretation will be reported in the next Quarterly Report.

IV. DISCUSSION

A complete analysis of the available data is not yet completed. The analysis will be continually updated through the impregnation phase of this program.

Based on a limited analysis, these observations are made:

1. Sintering temperature affects both strength and void. That is, low temperature produces high void and low strength, while high temperatures produce low void and high strength.
2. Slow belt speeds produced plaques with low void and high strength, while plaques produced at higher belt speeds had high void and low strength.
3. The effects of Dewpoint and atmosphere amount were the same as for temperature.
4. The spacing between the plaques had a greater effect on strength than void. Greater distance between plaques showed a marked reduction in strength and a smaller increase in void.
5. The cooling zones had very little affect on strength and void.
6. Strength and void appear to be inverse linear functions.

The preliminary analysis of the regressions indicate the existence of strong interactions between some of the variables. Because of the complexity of these interactions, the analysis is not complete.

An additional mid-level test was made to verify the regression equations. The results of this test were in good agreement with the pre-

dicted results and, therefore, indicate a good regression equation.

Weight and thickness variations appear to be greatest within each plaque. If this variation proves to be significant for good process control, an effort should be made to improve the method of preparing the plaque before sintering.

Work to be accomplished during the next quarter will include a more detailed analysis of the raw plaque data and the beginning of the impregnation study. Also to begin in the next quarter is a separator investigation and a ceramic-to-metal seal investigation.

REFERENCES

(1)
John M. Parry, Development of Uniform and Predictable Battery Materials For Nickel-Cadmium Aerospace Cells, Second Quarterly Report on Contract Number NAS5-11561, 8 February 1969 - 7 May 1969.

(2)
Dr. Leroy Folks, Statistics Department, Oklahoma State University, Stillwater, Oklahoma, Eagle-Picher Consultant.

A P P E N D I X

Table 1B (Continued)

305	1605.	6.	25.	815.	16.0	177.	90.	5.	1.682	0.0273	0.0215	392.46
305	1605.	6.	25.	815.	16.0	177.	90.	5.	1.705	0.0308	0.0250	225.32
305	1605.	6.	25.	815.	16.0	177.	90.	5.	1.623	0.0322	0.0266	227.86
305	1605.	6.	25.	815.	16.0	177.	90.	5.	1.626	0.0319	0.0263	199.00
305	1605.	6.	25.	815.	16.0	177.	90.	5.	1.642	0.0324	0.0268	214.33
306	1600.	6.	27.	820.	16.0	177.	90.	6.	1.685	0.0270	0.0212	447.53
306	1600.	6.	27.	820.	16.0	177.	90.	6.	1.727	0.0271	0.0212	536.15
306	1600.	6.	27.	820.	16.0	177.	90.	6.	1.726	0.0301	0.0242	298.01
306	1600.	6.	27.	820.	16.0	177.	90.	6.	1.672	0.0304	0.0247	267.81
306	1600.	6.	27.	820.	16.0	177.	90.	6.	1.679	0.0310	0.0252	280.96
306	1600.	6.	27.	820.	16.0	177.	90.	6.	1.631	0.0315	0.0259	272.11
306	1600.	6.	27.	820.	16.0	177.	90.	6.	1.625	0.0291	0.0235	265.70
306	1600.	6.	27.	820.	16.0	177.	90.	6.	1.636	0.0306	0.0250	276.34
306	1600.	6.	27.	820.	16.0	177.	90.	6.	1.660	0.0328	0.0271	250.97
311	1611.	6.	20.	800.	16.0	174.	83.	1.	1.709	0.0340	0.0281	184.90
311	1611.	6.	20.	800.	16.0	174.	83.	1.	1.697	0.0315	0.0257	340.14
311	1611.	6.	20.	800.	16.0	174.	83.	1.	1.678	0.0325	0.0267	202.37
311	1611.	6.	20.	800.	16.0	174.	83.	1.	1.683	0.0330	0.0272	175.62
311	1611.	6.	20.	800.	16.0	174.	83.	1.	1.709	0.0302	0.0243	234.36
311	1611.	6.	20.	800.	16.0	174.	83.	1.	1.699	0.0326	0.0268	201.13
311	1611.	6.	20.	800.	16.0	174.	83.	1.	1.682	0.0332	0.0274	183.72
311	1611.	6.	20.	800.	16.0	174.	83.	1.	1.645	0.0320	0.0264	186.77
311	1611.	6.	20.	800.	16.0	174.	83.	1.	1.680	0.0314	0.0256	193.97
312	1613.	6.	23.	800.	16.0	175.	83.	2.	1.705	0.0310	0.0252	234.13
312	1613.	6.	23.	800.	16.0	175.	83.	2.	1.642	0.0287	0.0231	382.43
312	1613.	6.	23.	800.	16.0	175.	83.	2.	1.661	0.0326	0.0269	211.71
312	1613.	6.	23.	800.	16.0	175.	83.	2.	1.690	0.0303	0.0245	245.07
312	1613.	6.	23.	800.	16.0	175.	83.	2.	1.658	0.0293	0.0236	235.88
312	1613.	6.	23.	800.	16.0	175.	83.	2.	1.664	0.0326	0.0269	211.71
312	1613.	6.	23.	800.	16.0	175.	83.	2.	1.693	0.0282	0.0224	254.64
312	1613.	6.	23.	800.	16.0	175.	83.	2.	1.675	0.0275	0.0218	267.77
312	1613.	6.	23.	800.	16.0	175.	83.	2.	1.647	0.0290	0.0234	240.78
313	1618.	6.	25.	800.	16.0	173.	83.	3.	1.700	0.0334	0.0276	191.61
313	1618.	6.	25.	800.	16.0	173.	83.	3.	1.664	0.0318	0.0261	267.00
313	1618.	6.	25.	800.	16.0	173.	83.	3.	1.649	0.0310	0.0253	234.13
313	1618.	6.	25.	800.	16.0	173.	83.	3.	1.678	0.0293	0.0235	262.09
313	1618.	6.	25.	800.	16.0	173.	83.	3.	1.673	0.0283	0.0226	252.84
313	1618.	6.	25.	800.	16.0	173.	83.	3.	1.646	0.0291	0.0235	265.70
313	1618.	6.	25.	800.	16.0	173.	83.	3.	1.715	0.0330	0.0271	196.28
313	1618.	6.	25.	800.	16.0	173.	83.	3.	1.697	0.0319	0.0261	176.89
313	1618.	6.	25.	800.	16.0	173.	83.	3.	1.655	0.0316	0.0259	202.79
314	1605.	6.	25.	800.	16.0	174.	83.	4.	1.684	0.0292	0.0234	369.44
314	1605.	6.	25.	800.	16.0	174.	83.	4.	1.672	0.0300	0.0243	375.00
314	1605.	6.	25.	800.	16.0	174.	83.	4.	1.704	0.0302	0.0244	246.70
314	1605.	6.	25.	800.	16.0	174.	83.	4.	1.687	0.0303	0.0245	208.31
314	1605.	6.	25.	800.	16.0	174.	83.	4.	1.677	0.0290	0.0232	267.54
314	1605.	6.	25.	800.	16.0	174.	83.	4.	1.649	0.0304	0.0247	219.12
314	1605.	6.	25.	800.	16.0	174.	83.	4.	1.697	0.0321	0.0263	207.44
314	1605.	6.	25.	800.	16.0	174.	83.	4.	1.675	0.0293	0.0236	248.98
314	1605.	6.	25.	800.	16.0	174.	83.	4.	1.647	0.0300	0.0244	225.00
315	1620.	6.	27.	800.	16.0	175.	84.	5.	1.705	0.0302	0.0244	259.03
315	1620.	6.	27.	800.	16.0	175.	84.	5.	1.714	0.0309	0.0250	365.26
315	1620.	6.	27.	800.	16.0	175.	84.	5.	1.670	0.0315	0.0258	272.11
315	1620.	6.	27.	800.	16.0	175.	84.	5.	1.672	0.0315	0.0258	215.42
315	1620.	6.	27.	800.	16.0	175.	84.	5.	1.689	0.0314	0.0256	193.97
315	1620.	6.	27.	800.	16.0	175.	84.	5.	1.729	0.0318	0.0259	222.50
315	1620.	6.	27.	800.	16.0	175.	84.	5.	1.641	0.0290	0.0234	254.16
315	1620.	6.	27.	800.	16.0	175.	84.	5.	1.646	0.0313	0.0257	218.18
315	1620.	6.	27.	800.	16.0	175.	84.	5.	1.632	0.0310	0.0254	234.13
316	1610.	6.	28.	800.	16.0	176.	85.	6.	1.744	0.0323	0.0263	269.58
316	1610.	6.	28.	800.	16.0	176.	85.	6.	1.682	0.0298	0.0240	342.05
316	1610.	6.	28.	800.	16.0	176.	85.	6.	1.638	0.0316	0.0260	281.66
316	1610.	6.	28.	800.	16.0	176.	85.	6.	1.684	0.0316	0.0258	225.32

Table 1B (Continued)

316	1610.	6.	28.	800.	16.0	176.	85.	6.	1.669	0.0294	0.0237	260.31
316	1610.	6.	28.	800.	16.0	176.	85.	6.	1.691	0.0310	0.0252	257.54
316	1610.	6.	28.	800.	16.0	176.	85.	6.	1.691	0.0320	0.0262	219.73
316	1610.	6.	28.	800.	16.0	176.	85.	6.	1.659	0.0296	0.0239	256.80
316	1610.	6.	28.	800.	16.0	176.	85.	6.	1.637	0.0299	0.0243	239.09
401	1860.	12.	46.	400.	0.1	77.	94.	1.	1.681	0.0280	0.0222	559.63
401	1860.	12.	46.	400.	0.1	77.	94.	1.	1.720	0.0286	0.0227	508.89
401	1860.	12.	46.	400.	0.1	77.	94.	1.	1.699	0.0295	0.0237	530.02
401	1860.	12.	46.	400.	0.1	77.	94.	1.	1.664	0.0270	0.0213	570.99
401	1860.	12.	46.	400.	0.1	77.	94.	1.	1.668	0.0282	0.0225	509.28
401	1860.	12.	46.	400.	0.1	77.	94.	1.	1.632	0.0286	0.0230	508.89
401	1860.	12.	46.	400.	0.1	77.	94.	1.	1.658	0.0287	0.0230	464.37
401	1860.	12.	46.	400.	0.1	77.	94.	1.	1.658	0.0292	0.0235	448.61
401	1860.	12.	46.	400.	0.1	77.	94.	1.	1.664	0.0294	0.0237	481.57
402	1860.	12.	46.	400.	0.1	77.	95.	2.	1.670	0.0289	0.0232	498.38
402	1860.	12.	46.	400.	0.1	77.	95.	2.	1.669	0.0288	0.0231	501.84
402	1860.	12.	46.	400.	0.1	77.	95.	2.	1.679	0.0291	0.0233	491.55
402	1860.	12.	46.	400.	0.1	77.	95.	2.	1.735	0.0293	0.0233	484.86
402	1860.	12.	46.	400.	0.1	77.	95.	2.	1.696	0.0284	0.0226	488.18
402	1860.	12.	46.	400.	0.1	77.	95.	2.	1.613	0.0286	0.0231	481.38
402	1860.	12.	46.	400.	0.1	77.	95.	2.	1.713	0.0280	0.0221	473.53
402	1860.	12.	46.	400.	0.1	77.	95.	2.	1.696	0.0282	0.0224	495.13
402	1860.	12.	46.	400.	0.1	77.	95.	2.	1.748	0.0286	0.0226	412.61
403	1860.	12.	46.	400.	0.1	77.	95.	3.	1.668	0.0289	0.0232	457.97
403	1860.	12.	46.	400.	0.1	77.	95.	3.	1.663	0.0278	0.0221	567.71
403	1860.	12.	46.	400.	0.1	77.	95.	3.	1.665	0.0270	0.0213	586.42
403	1860.	12.	46.	400.	0.1	77.	95.	3.	1.669	0.0275	0.0218	550.41
403	1860.	12.	46.	400.	0.1	77.	95.	3.	1.701	0.0250	0.0192	756.00
403	1860.	12.	46.	400.	0.1	77.	95.	3.	1.733	0.0286	0.0227	522.64
403	1860.	12.	46.	400.	0.1	77.	95.	3.	1.660	0.0288	0.0231	542.53
403	1860.	12.	46.	400.	0.1	77.	95.	3.	1.683	0.0294	0.0236	507.60
403	1860.	12.	46.	400.	0.1	77.	95.	3.	1.633	0.0287	0.0231	478.03
404	1861.	12.	47.	400.	0.1	77.	96.	4.	1.660	0.0275	0.0218	595.04
404	1861.	12.	47.	400.	0.1	77.	96.	4.	1.663	0.0272	0.0215	638.65
404	1861.	12.	47.	400.	0.1	77.	96.	4.	1.728	0.0285	0.0226	526.32
404	1861.	12.	47.	400.	0.1	77.	96.	4.	1.742	0.0286	0.0226	618.92
404	1861.	12.	47.	400.	0.1	77.	96.	4.	1.735	0.0261	0.0201	693.62
404	1861.	12.	47.	400.	0.1	77.	96.	4.	1.730	0.0284	0.0225	530.03
404	1861.	12.	47.	400.	0.1	77.	96.	4.	1.719	0.0281	0.0222	584.15
404	1861.	12.	47.	400.	0.1	77.	96.	4.	1.739	0.0281	0.0221	569.90
404	1861.	12.	47.	400.	0.1	77.	96.	4.	1.739	0.0287	0.0227	559.98
405	1861.	12.	47.	400.	0.1	78.	96.	5.	1.653	0.0280	0.0223	545.28
405	1861.	12.	47.	400.	0.1	78.	96.	5.	1.680	0.0275	0.0217	595.04
405	1861.	12.	47.	400.	0.1	78.	96.	5.	1.688	0.0289	0.0231	538.79
405	1861.	12.	47.	400.	0.1	78.	96.	5.	1.714	0.0289	0.0230	511.85
405	1861.	12.	47.	400.	0.1	78.	96.	5.	1.760	0.0273	0.0213	649.08
405	1861.	12.	47.	400.	0.1	78.	96.	5.	1.685	0.0285	0.0227	554.02
405	1861.	12.	47.	400.	0.1	78.	96.	5.	1.742	0.0284	0.0224	530.03
405	1861.	12.	47.	400.	0.1	78.	96.	5.	1.706	0.0268	0.0209	595.21
405	1861.	12.	47.	400.	0.1	78.	96.	5.	1.710	0.0286	0.0227	522.64
406	1861.	12.	47.	400.	0.1	78.	97.	6.	1.778	0.0299	0.0238	641.77
406	1861.	12.	47.	400.	0.1	78.	97.	6.	1.772	0.0295	0.0234	659.29
406	1861.	12.	47.	400.	0.1	78.	97.	6.	1.749	0.0304	0.0244	523.45
406	1861.	12.	47.	400.	0.1	78.	97.	6.	1.753	0.0303	0.0243	502.40
406	1861.	12.	47.	400.	0.1	78.	97.	6.	1.802	0.0299	0.0237	415.26
406	1861.	12.	47.	400.	0.1	78.	97.	6.	1.727	0.0296	0.0237	436.56
406	1861.	12.	47.	400.	0.1	78.	97.	6.	1.636	0.0297	0.0241	382.61
406	1861.	12.	47.	400.	0.1	78.	97.	6.	1.717	0.0298	0.0239	418.06
406	1861.	12.	47.	400.	0.1	78.	97.	6.	1.720	0.0303	0.0244	392.12
411	1868.	12.	41.	396.	0.1	76.	103.	1.	1.709	0.0302	0.0243	493.40
411	1868.	12.	41.	396.	0.1	76.	103.	1.	1.683	0.0277	0.0219	586.48
411	1868.	12.	41.	396.	0.1	76.	103.	1.	1.637	0.0276	0.0220	531.66
411	1868.	12.	41.	396.	0.1	76.	103.	1.	1.626	0.0284	0.0228	474.24

Table 1B (Continued)

411	1868.	12.	41.	396.	0.1	76.	103.	1.	1.711	0.0264	0.0205	694.09
411	1868.	12.	41.	396.	0.1	76.	103.	1.	1.662	0.0278	0.0221	553.15
411	1868.	12.	41.	396.	0.1	76.	103.	1.	1.670	0.0289	0.0232	471.44
411	1868.	12.	41.	396.	0.1	76.	103.	1.	1.674	0.0272	0.0215	577.83
411	1868.	12.	41.	396.	0.1	76.	103.	1.	1.667	0.0280	0.0223	487.88
412	1866.	12.	41.	392.	0.1	77.	103.	2.	1.688	0.0296	0.0238	423.72
412	1866.	12.	41.	392.	0.1	77.	103.	2.	1.655	0.0297	0.0240	420.88
412	1866.	12.	41.	392.	0.1	77.	103.	2.	1.621	0.0298	0.0242	468.73
412	1866.	12.	41.	392.	0.1	77.	103.	2.	1.662	0.0286	0.0229	495.13
412	1866.	12.	41.	392.	0.1	77.	103.	2.	1.649	0.0272	0.0215	547.42
412	1866.	12.	41.	392.	0.1	77.	103.	2.	1.659	0.0283	0.0226	449.50
412	1866.	12.	41.	392.	0.1	77.	103.	2.	1.698	0.0286	0.0228	508.89
412	1866.	12.	41.	392.	0.1	77.	103.	2.	1.651	0.0274	0.0217	539.45
412	1866.	12.	41.	392.	0.1	77.	103.	2.	1.646	0.0266	0.0210	508.79
413	1864.	12.	41.	388.	0.1	78.	103.	3.	1.725	0.0293	0.0234	589.70
413	1864.	12.	41.	388.	0.1	78.	103.	3.	1.728	0.0297	0.0238	599.43
413	1864.	12.	41.	388.	0.1	78.	103.	3.	1.712	0.0279	0.0220	664.82
413	1864.	12.	41.	388.	0.1	78.	103.	3.	1.709	0.0280	0.0221	674.43
413	1864.	12.	41.	388.	0.1	78.	103.	3.	1.747	0.0293	0.0233	511.07
413	1864.	12.	41.	388.	0.1	78.	103.	3.	1.714	0.0280	0.0221	617.03
413	1864.	12.	41.	388.	0.1	78.	103.	3.	1.718	0.0291	0.0232	597.83
413	1864.	12.	41.	388.	0.1	78.	103.	3.	1.705	0.0288	0.0230	542.53
413	1864.	12.	41.	388.	0.1	78.	103.	3.	1.678	0.0289	0.0231	511.85
414	1862.	12.	41.	384.	0.1	77.	102.	4.	1.826	0.0296	0.0233	654.85
414	1862.	12.	41.	384.	0.1	77.	102.	4.	1.657	0.0275	0.0218	520.66
414	1862.	12.	41.	384.	0.1	77.	102.	4.	1.608	0.0274	0.0219	524.47
414	1862.	12.	41.	384.	0.1	77.	102.	4.	1.632	0.0292	0.0236	461.80
414	1862.	12.	41.	384.	0.1	77.	102.	4.	1.638	0.0296	0.0240	449.40
414	1862.	12.	41.	384.	0.1	77.	102.	4.	1.634	0.0295	0.0239	478.31
414	1862.	12.	41.	384.	0.1	77.	102.	4.	1.631	0.0286	0.0230	453.87
414	1862.	12.	41.	384.	0.1	77.	102.	4.	1.617	0.0294	0.0239	429.51
414	1862.	12.	41.	384.	0.1	77.	102.	4.	1.605	0.0297	0.0242	420.88
415	1860.	12.	41.	380.	0.1	76.	102.	5.	1.693	0.0289	0.0231	457.97
415	1860.	12.	41.	380.	0.1	76.	102.	5.	1.686	0.0287	0.0229	600.95
415	1860.	12.	41.	380.	0.1	76.	102.	5.	1.668	0.0285	0.0228	526.32
415	1860.	12.	41.	380.	0.1	76.	102.	5.	1.678	0.0277	0.0219	542.49
415	1860.	12.	41.	380.	0.1	76.	102.	5.	1.668	0.0270	0.0213	509.26
415	1860.	12.	41.	380.	0.1	76.	102.	5.	1.694	0.0292	0.0234	527.77
415	1860.	12.	41.	380.	0.1	76.	102.	5.	1.646	0.0283	0.0227	505.69
415	1860.	12.	41.	380.	0.1	76.	102.	5.	1.673	0.0272	0.0215	547.42
415	1860.	12.	41.	380.	0.1	76.	102.	5.	1.728	0.0291	0.0232	411.84
416	1862.	12.	41.	380.	0.1	75.	102.	6.	1.723	0.0282	0.0223	679.04
416	1862.	12.	41.	380.	0.1	75.	102.	6.	1.718	0.0276	0.0217	694.12
416	1862.	12.	41.	380.	0.1	75.	102.	6.	1.681	0.0282	0.0224	495.13
416	1862.	12.	41.	380.	0.1	75.	102.	6.	1.682	0.0286	0.0228	508.89
416	1862.	12.	41.	380.	0.1	75.	102.	6.	1.671	0.0279	0.0222	534.74
416	1862.	12.	41.	380.	0.1	75.	102.	6.	1.658	0.0284	0.0227	488.18
416	1862.	12.	41.	380.	0.1	75.	102.	6.	1.694	0.0302	0.0244	456.39
416	1862.	12.	41.	380.	0.1	75.	102.	6.	1.648	0.0275	0.0218	505.79
416	1862.	12.	41.	380.	0.1	75.	102.	6.	1.609	0.0283	0.0228	393.31
501	1865.	6.	46.	400.	0.1	172.	87.	1.	1.620	0.0278	0.0222	553.15
501	1865.	6.	46.	400.	0.1	172.	87.	1.	1.685	0.0263	0.0205	764.43
501	1865.	6.	46.	400.	0.1	172.	87.	1.	1.678	0.0271	0.0213	628.06
501	1865.	6.	46.	400.	0.1	172.	87.	1.	1.698	0.0275	0.0217	699.17
501	1865.	6.	46.	400.	0.1	172.	87.	1.	1.700	0.0255	0.0197	795.85
501	1865.	6.	46.	400.	0.1	172.	87.	1.	1.741	0.0268	0.0208	736.18
501	1865.	6.	46.	400.	0.1	172.	87.	1.	1.675	0.0280	0.0223	631.38
501	1865.	6.	46.	400.	0.1	172.	87.	1.	1.699	0.0266	0.0208	747.29
501	1865.	6.	46.	400.	0.1	172.	87.	1.	1.727	0.0277	0.0218	703.78
502	1865.	6.	47.	400.	0.1	173.	87.	2.	1.626	0.0258	0.0202	692.94
502	1865.	6.	47.	400.	0.1	173.	87.	2.	1.659	0.0260	0.0203	715.61
502	1865.	6.	47.	400.	0.1	173.	87.	2.	1.653	0.0261	0.0204	627.56
502	1865.	6.	47.	400.	0.1	173.	87.	2.	1.640	0.0254	0.0198	802.13

Table 1B (Continued)

502	1865.	6.	47.	400.	0.1	173.	87.	2.	1.647	0.0246	0.0190	743.61
502	1865.	6.	47.	400.	0.1	173.	87.	2.	1.644	0.0251	0.0195	714.27
502	1865.	6.	47.	400.	0.1	173.	87.	2.	1.734	0.0270	0.0211	740.74
502	1865.	6.	47.	400.	0.1	173.	87.	2.	1.775	0.0268	0.0207	673.52
502	1865.	6.	47.	400.	0.1	173.	87.	2.	1.720	0.0270	0.0211	663.58
503	1864.	6.	47.	380.	0.1	173.	88.	3.	1.630	0.0259	0.0203	637.29
503	1864.	6.	47.	380.	0.1	173.	88.	3.	1.653	0.0272	0.0215	577.83
503	1864.	6.	47.	380.	0.1	173.	88.	3.	1.688	0.0276	0.0218	605.51
503	1864.	6.	47.	380.	0.1	173.	88.	3.	1.732	0.0265	0.0206	801.00
503	1864.	6.	47.	380.	0.1	173.	88.	3.	1.688	0.0270	0.0212	663.58
503	1864.	6.	47.	380.	0.1	173.	88.	3.	1.644	0.0277	0.0221	615.80
503	1864.	6.	47.	380.	0.1	173.	88.	3.	1.732	0.0270	0.0211	617.28
503	1864.	6.	47.	380.	0.1	173.	88.	3.	1.800	0.0277	0.0215	747.76
503	1864.	6.	47.	380.	0.1	173.	88.	3.	1.905	0.0283	0.0218	899.00
504	1863.	6.	45.	380.	0.1	174.	89.	4.	1.733	0.0272	0.0213	653.86
504	1863.	6.	45.	380.	0.1	174.	89.	4.	1.740	0.0269	0.0209	668.52
504	1863.	6.	45.	380.	0.1	174.	89.	4.	1.719	0.0273	0.0214	679.27
504	1863.	5.	45.	380.	0.1	174.	89.	4.	1.700	0.0270	0.0212	648.15
504	1863.	6.	45.	380.	0.1	174.	89.	4.	1.682	0.0266	0.0208	699.59
504	1863.	6.	45.	380.	0.1	174.	89.	4.	1.660	0.0269	0.0212	652.98
504	1863.	6.	45.	380.	0.1	174.	89.	4.	1.895	0.0286	0.0221	797.72
504	1863.	6.	45.	380.	0.1	174.	89.	4.	1.758	0.0267	0.0207	694.36
504	1863.	6.	45.	380.	0.1	174.	89.	4.	1.757	0.0274	0.0214	764.23
505	1862.	6.	44.	380.	0.1	174.	89.	5.	1.768	0.0260	0.0199	782.17
505	1862.	6.	44.	380.	0.1	174.	89.	5.	1.923	0.0273	0.0207	1071.73
505	1862.	6.	44.	380.	0.1	174.	89.	5.	1.890	0.0276	0.0211	945.18
505	1862.	6.	44.	380.	0.1	174.	89.	5.	1.789	0.0279	0.0218	722.63
505	1862.	6.	44.	380.	0.1	174.	89.	5.	1.734	0.0275	0.0216	743.80
505	1862.	6.	44.	380.	0.1	174.	89.	5.	1.699	0.0280	0.0222	731.82
505	1862.	6.	44.	380.	0.1	174.	89.	5.	1.723	0.0273	0.0214	754.74
505	1862.	6.	44.	380.	0.1	174.	89.	5.	1.726	0.0268	0.0209	689.19
505	1862.	6.	44.	380.	0.1	174.	89.	5.	1.726	0.0274	0.0215	734.26
506	1862.	6.	44.	380.	0.1	174.	90.	6.	1.708	0.0280	0.0221	674.43
506	1862.	6.	44.	380.	0.1	174.	90.	6.	1.722	0.0276	0.0217	708.88
506	1862.	6.	44.	380.	0.1	174.	90.	6.	1.659	0.0281	0.0224	683.88
506	1862.	6.	44.	380.	0.1	174.	90.	6.	1.710	0.0271	0.0212	704.65
506	1862.	6.	44.	380.	0.1	174.	90.	6.	1.690	0.0277	0.0219	689.11
506	1862.	6.	44.	380.	0.1	174.	90.	6.	1.730	0.0281	0.0222	693.88
506	1862.	6.	44.	380.	0.1	174.	90.	6.	1.702	0.0285	0.0227	623.27
506	1862.	6.	44.	380.	0.1	174.	90.	6.	1.713	0.0286	0.0227	550.15
506	1862.	6.	44.	380.	0.1	174.	90.	6.	1.703	0.0290	0.0232	535.08
511	1863.	6.	41.	380.	0.1	177.	98.	1.	1.696	0.0268	0.0210	689.19
511	1863.	6.	41.	380.	0.1	177.	98.	1.	1.659	0.0260	0.0203	732.25
511	1863.	6.	41.	380.	0.1	177.	98.	1.	1.631	0.0273	0.0217	649.08
511	1863.	6.	41.	380.	0.1	177.	98.	1.	1.665	0.0268	0.0211	626.53
511	1863.	6.	41.	380.	0.1	177.	98.	1.	1.655	0.0255	0.0198	743.94
511	1863.	6.	41.	380.	0.1	177.	98.	1.	1.687	0.0273	0.0215	664.17
511	1863.	6.	41.	380.	0.1	177.	98.	1.	1.661	0.0272	0.0215	653.86
511	1863.	6.	41.	380.	0.1	177.	98.	1.	1.628	0.0260	0.0204	632.40
511	1863.	6.	41.	380.	0.1	177.	98.	1.	1.595	0.0262	0.0207	606.39
512	1861.	6.	42.	380.	0.1	176.	98.	2.	1.696	0.0281	0.0223	669.63
512	1861.	6.	42.	380.	0.1	176.	98.	2.	1.675	0.0275	0.0218	669.42
512	1861.	6.	42.	380.	0.1	176.	98.	2.	1.649	0.0273	0.0216	633.98
512	1861.	6.	42.	380.	0.1	176.	98.	2.	1.699	0.0260	0.0202	732.25
512	1861.	6.	42.	380.	0.1	176.	98.	2.	1.677	0.0232	0.0174	961.47
512	1861.	6.	42.	380.	0.1	176.	98.	2.	1.649	0.0254	0.0197	749.81
512	1861.	6.	42.	380.	0.1	176.	98.	2.	1.670	0.0265	0.0208	698.86
512	1861.	6.	42.	380.	0.1	176.	98.	2.	1.653	0.0249	0.0192	689.51
512	1861.	6.	42.	380.	0.1	176.	98.	2.	1.673	0.0264	0.0207	629.52
513	1860.	6.	42.	390.	0.1	176.	98.	3.	1.723	0.0280	0.0221	674.43
513	1860.	6.	42.	390.	0.1	176.	98.	3.	1.673	0.0271	0.0214	719.97
513	1860.	6.	42.	390.	0.1	176.	98.	3.	1.649	0.0283	0.0226	589.97
513	1860.	6.	42.	390.	0.1	176.	98.	3.	1.625	0.0266	0.0210	667.79

Table 13 (Continued)

513	1860.	6.	42.	390.	0.1	176.	98.	3.	1.672	0.0250	0.0193	738.00
513	1860.	6.	42.	390.	0.1	176.	98.	3.	1.687	0.0270	0.0212	632.72
513	1860.	6.	42.	390.	0.1	176.	98.	3.	1.669	0.0285	0.0228	581.72
513	1860.	6.	42.	390.	0.1	176.	98.	3.	1.649	0.0268	0.0211	704.85
513	1860.	6.	42.	390.	0.1	176.	98.	3.	1.717	0.0270	0.0211	601.85
514	1860.	6.	43.	400.	0.1	176.	100.	4.	1.692	0.0269	0.0211	792.90
514	1860.	6.	43.	400.	0.1	176.	100.	4.	1.655	0.0264	0.0207	807.08
514	1860.	6.	43.	400.	0.1	176.	100.	4.	1.634	0.0270	0.0214	679.01
514	1860.	6.	43.	400.	0.1	176.	100.	4.	1.657	0.0262	0.0205	721.11
514	1860.	6.	43.	400.	0.1	176.	100.	4.	1.667	0.0272	0.0215	669.06
514	1860.	6.	43.	400.	0.1	176.	100.	4.	1.658	0.0271	0.0214	597.42
514	1860.	6.	43.	400.	0.1	176.	100.	4.	1.684	0.0246	0.0188	817.97
514	1860.	6.	43.	400.	0.1	176.	100.	4.	1.665	0.0265	0.0208	688.86
514	1860.	6.	43.	400.	0.1	176.	100.	4.	1.659	0.0268	0.0211	689.19
515	1860.	6.	45.	400.	0.1	176.	104.	5.	1.673	0.0250	0.0193	810.00
515	1860.	6.	45.	400.	0.1	176.	104.	5.	1.673	0.0251	0.0194	857.13
515	1860.	6.	45.	400.	0.1	176.	104.	5.	1.634	0.0249	0.0193	780.23
515	1860.	6.	45.	400.	0.1	176.	104.	5.	1.657	0.0272	0.0215	669.06
515	1860.	6.	45.	400.	0.1	176.	104.	5.	1.709	0.0264	0.0205	694.09
515	1860.	6.	45.	400.	0.1	176.	104.	5.	1.652	0.0266	0.0209	651.89
515	1860.	6.	45.	400.	0.1	176.	104.	5.	1.658	0.0273	0.0216	649.08
515	1860.	6.	45.	400.	0.1	176.	104.	5.	1.631	0.0261	0.0205	594.53
515	1860.	6.	45.	400.	0.1	176.	104.	5.	1.629	0.0267	0.0211	631.23
516	1860.	6.	46.	400.	0.1	176.	106.	6.	1.702	0.0291	0.0233	571.26
516	1860.	6.	46.	400.	0.1	176.	106.	6.	1.696	0.0289	0.0231	619.60
516	1860.	6.	46.	400.	0.1	176.	106.	6.	1.654	0.0274	0.0217	554.44
516	1860.	6.	46.	400.	0.1	176.	106.	6.	1.651	0.0278	0.0221	524.04
516	1860.	6.	46.	400.	0.1	176.	106.	6.	1.654	0.0271	0.0214	643.37
516	1860.	6.	46.	400.	0.1	176.	106.	6.	1.660	0.0272	0.0215	623.45
516	1860.	6.	46.	400.	0.1	176.	106.	6.	1.669	0.0306	0.0249	384.47
516	1860.	6.	46.	400.	0.1	176.	106.	6.	1.659	0.0296	0.0239	436.56
516	1860.	6.	46.	400.	0.1	176.	106.	6.	1.654	0.0293	0.0236	432.45
601	1862.	6.	25.	800.	0.1	76.	85.	1.	1.714	0.0284	0.0225	753.20
601	1862.	6.	25.	800.	0.1	76.	85.	1.	1.696	0.0276	0.0218	782.73
601	1862.	6.	25.	800.	0.1	76.	85.	1.	1.723	0.0284	0.0225	767.15
601	1862.	6.	25.	800.	0.1	76.	85.	1.	1.679	0.0269	0.0211	777.35
601	1862.	6.	25.	800.	0.1	76.	85.	1.	1.658	0.0266	0.0209	779.09
601	1862.	6.	25.	800.	0.1	76.	85.	1.	1.660	0.0265	0.0208	736.92
601	1862.	6.	25.	800.	0.1	76.	85.	1.	1.658	0.0262	0.0205	737.50
601	1862.	6.	25.	800.	0.1	76.	85.	1.	1.648	0.0267	0.0210	741.70
601	1862.	6.	25.	800.	0.1	76.	85.	1.	1.658	0.0276	0.0219	738.42
602	1861.	6.	25.	800.	0.1	75.	85.	2.	1.658	0.0251	0.0194	928.56
602	1861.	6.	25.	800.	0.1	75.	85.	2.	1.696	0.0265	0.0207	881.10
602	1861.	6.	25.	800.	0.1	75.	85.	2.	1.710	0.0260	0.0201	882.03
602	1861.	6.	25.	800.	0.1	75.	85.	2.	1.715	0.0254	0.0195	941.63
602	1861.	6.	25.	800.	0.1	75.	85.	2.	1.712	0.0256	0.0197	944.14
602	1861.	6.	25.	800.	0.1	75.	85.	2.	1.683	0.0258	0.0200	878.85
602	1861.	6.	25.	800.	0.1	75.	85.	2.	1.737	0.0255	0.0195	916.96
602	1861.	6.	25.	800.	0.1	75.	85.	2.	1.732	0.0258	0.0199	845.05
602	1861.	6.	25.	800.	0.1	75.	85.	2.	1.718	0.0258	0.0199	963.36
603	1860.	6.	25.	800.	0.1	75.	85.	3.	1.644	0.0275	0.0219	783.43
603	1860.	6.	25.	800.	0.1	75.	85.	3.	1.696	0.0270	0.0212	802.47
603	1860.	6.	25.	800.	0.1	75.	85.	3.	1.675	0.0275	0.0218	728.93
603	1860.	6.	25.	800.	0.1	75.	85.	3.	1.747	0.0280	0.0220	817.92
603	1860.	6.	25.	800.	0.1	75.	85.	3.	1.728	0.0277	0.0218	850.40
603	1860.	6.	25.	800.	0.1	75.	85.	3.	1.702	0.0270	0.0212	864.20
603	1860.	6.	25.	800.	0.1	75.	85.	3.	1.697	0.0268	0.0210	892.81
603	1860.	6.	25.	800.	0.1	75.	85.	3.	1.717	0.0265	0.0206	817.02
603	1860.	6.	25.	800.	0.1	75.	85.	3.	1.722	0.0262	0.0203	868.61
604	1861.	6.	25.	800.	0.1	76.	85.	4.	1.682	0.0265	0.0207	752.94
604	1861.	6.	25.	800.	0.1	76.	85.	4.	1.699	0.0275	0.0217	728.93
604	1861.	6.	25.	800.	0.1	76.	85.	4.	1.697	0.0286	0.0228	673.93
604	1861.	6.	25.	800.	0.1	76.	85.	4.	1.801	0.0271	0.0209	965.06

Table 1B (Continued)

604	1861.	6.	25.	800.	0.1	76.	85.	4.	1.732	0.0251	0.0192	999.98
604	1861.	6.	25.	800.	0.1	76.	85.	4.	1.694	0.0272	0.0214	805.92
604	1861.	6.	25.	800.	0.1	76.	85.	4.	1.683	0.0270	0.0212	740.74
604	1861.	6.	25.	800.	0.1	76.	85.	4.	1.732	0.0266	0.0207	842.69
604	1861.	6.	25.	800.	0.1	76.	85.	4.	1.692	0.0275	0.0217	847.93
605	1861.	6.	25.	800.	0.1	76.	86.	5.	1.703	0.0282	0.0224	707.33
605	1861.	6.	25.	800.	0.1	76.	86.	5.	1.703	0.0282	0.0224	679.04
605	1861.	6.	25.	800.	0.1	76.	86.	5.	1.701	0.0290	0.0232	708.98
605	1861.	6.	25.	800.	0.1	76.	86.	5.	1.750	0.0285	0.0225	775.62
605	1861.	6.	25.	800.	0.1	76.	86.	5.	1.750	0.0281	0.0221	797.86
605	1861.	6.	25.	800.	0.1	76.	86.	5.	1.705	0.0283	0.0225	800.67
605	1861.	6.	25.	800.	0.1	76.	86.	5.	1.713	0.0269	0.0210	839.54
605	1861.	6.	25.	800.	0.1	76.	86.	5.	1.708	0.0280	0.0221	760.52
605	1861.	6.	25.	800.	0.1	76.	86.	5.	1.704	0.0272	0.0214	745.09
606	1861.	6.	25.	800.	0.1	76.	87.	6.	1.638	0.0254	0.0198	837.00
606	1861.	6.	25.	800.	0.1	76.	87.	6.	1.667	0.0253	0.0196	826.06
606	1861.	6.	25.	800.	0.1	76.	87.	6.	1.668	0.0252	0.0195	903.49
606	1861.	6.	25.	800.	0.1	76.	87.	6.	1.681	0.0255	0.0197	934.26
606	1861.	6.	25.	800.	0.1	76.	87.	6.	1.705	0.0278	0.0220	771.51
606	1861.	6.	25.	800.	0.1	76.	87.	6.	1.655	0.0264	0.0207	823.22
606	1861.	6.	25.	800.	0.1	76.	87.	6.	1.665	0.0264	0.0207	807.08
606	1861.	6.	25.	800.	0.1	76.	87.	6.	1.659	0.0271	0.0214	750.60
606	1861.	6.	25.	800.	0.1	76.	87.	6.	1.662	0.0273	0.0216	784.93
701	1595.	12.	48.	820.	16.0	177.	93.	1.	1.683	0.0322	0.0264	271.26
701	1595.	12.	48.	820.	16.0	177.	93.	1.	1.618	0.0313	0.0258	241.15
701	1595.	12.	48.	820.	16.0	177.	93.	1.	1.644	0.0325	0.0269	234.32
701	1595.	12.	48.	820.	16.0	177.	93.	1.	1.692	0.0316	0.0258	259.12
701	1595.	12.	48.	820.	16.0	177.	93.	1.	1.727	0.0317	0.0258	257.49
701	1595.	12.	48.	820.	16.0	177.	93.	1.	1.752	0.0325	0.0265	287.57
701	1595.	12.	48.	820.	16.0	177.	93.	1.	1.723	0.0321	0.0262	218.36
701	1595.	12.	48.	820.	16.0	177.	93.	1.	1.653	0.0323	0.0266	258.80
701	1595.	12.	48.	820.	16.0	177.	93.	1.	1.728	0.0318	0.0259	244.75
702	1590.	12.	48.	820.	16.0	176.	95.	2.	1.665	0.0316	0.0259	259.12
702	1590.	12.	48.	820.	16.0	176.	95.	2.	1.728	0.0303	0.0244	294.09
702	1590.	12.	48.	820.	16.0	176.	95.	2.	1.620	0.0311	0.0255	267.52
702	1590.	12.	48.	820.	16.0	176.	95.	2.	1.703	0.0310	0.0252	269.25
702	1590.	12.	48.	820.	16.0	176.	95.	2.	1.767	0.0318	0.0257	255.87
702	1590.	12.	48.	820.	16.0	176.	95.	2.	1.704	0.0323	0.0265	280.36
702	1590.	12.	48.	820.	16.0	176.	95.	2.	1.701	0.0301	0.0243	322.84
702	1590.	12.	48.	820.	16.0	176.	95.	2.	1.629	0.0291	0.0235	345.41
702	1590.	12.	48.	820.	16.0	176.	95.	2.	1.700	0.0310	0.0252	210.72
703	1580.	12.	48.	820.	16.0	175.	97.	3.	1.714	0.0310	0.0251	327.78
703	1580.	12.	48.	820.	16.0	175.	97.	3.	1.692	0.0293	0.0235	314.51
703	1580.	12.	48.	820.	16.0	175.	97.	3.	1.701	0.0323	0.0265	258.80
703	1580.	12.	48.	820.	16.0	175.	97.	3.	1.761	0.0322	0.0262	271.26
703	1580.	12.	48.	820.	16.0	175.	97.	3.	1.825	0.0328	0.0265	262.34
703	1580.	12.	48.	820.	16.0	175.	97.	3.	1.838	0.0328	0.0265	262.34
703	1580.	12.	48.	820.	16.0	175.	97.	3.	1.747	0.0324	0.0264	289.35
703	1580.	12.	48.	820.	16.0	175.	97.	3.	1.687	0.0318	0.0260	269.25
703	1580.	12.	48.	820.	16.0	175.	97.	3.	1.702	0.0324	0.0266	267.92
704	1580.	12.	47.	820.	16.0	175.	97.	4.	1.710	0.0310	0.0251	327.78
704	1580.	12.	47.	820.	16.0	175.	97.	4.	1.677	0.0308	0.0250	332.05
704	1580.	12.	47.	820.	16.0	175.	97.	4.	1.654	0.0312	0.0255	323.59
704	1580.	12.	47.	820.	16.0	175.	97.	4.	1.700	0.0320	0.0262	285.64
704	1580.	12.	47.	820.	16.0	175.	97.	4.	1.680	0.0291	0.0233	371.98
704	1580.	12.	47.	820.	16.0	175.	97.	4.	1.728	0.0309	0.0250	318.13
704	1580.	12.	47.	820.	16.0	175.	97.	4.	1.659	0.0320	0.0263	274.66
704	1580.	12.	47.	820.	16.0	175.	97.	4.	1.664	0.0318	0.0261	233.62
704	1580.	12.	47.	820.	16.0	175.	97.	4.	1.644	0.0313	0.0257	229.66
705	1580.	12.	47.	820.	16.0	175.	97.	5.	1.666	0.0319	0.0262	221.11
705	1580.	12.	47.	820.	16.0	175.	97.	5.	1.625	0.0327	0.0271	210.42
705	1580.	12.	47.	820.	16.0	175.	97.	5.	1.679	0.0314	0.0256	228.20
705	1580.	12.	47.	820.	16.0	175.	97.	5.	1.631	0.0315	0.0259	238.10

Table 1B (Continued)

705	1580.	12.	47.	820.	16.0	175.	97.	5.	1.624	0.0315	0.0259	272.11
705	1580.	12.	47.	820.	16.0	175.	97.	5.	1.644	0.0308	0.0252	284.62
705	1580.	12.	47.	820.	16.0	175.	97.	5.	1.632	0.0321	0.0265	229.28
705	1580.	12.	47.	820.	16.0	175.	97.	5.	1.622	0.0323	0.0267	215.66
705	1580.	12.	47.	820.	16.0	175.	97.	5.	1.651	0.0323	0.0266	215.66
706	1575.	12.	47.	820.	16.0	175.	97.	6.	1.679	0.0287	0.0229	368.77
706	1575.	12.	47.	820.	16.0	175.	97.	6.	1.699	0.0301	0.0243	335.26
706	1575.	12.	47.	820.	16.0	175.	97.	6.	1.733	0.0303	0.0244	343.10
706	1575.	12.	47.	820.	16.0	175.	97.	6.	1.678	0.0290	0.0232	334.42
706	1575.	12.	47.	820.	16.0	175.	97.	6.	1.662	0.0280	0.0223	373.09
706	1575.	12.	47.	820.	16.0	175.	97.	6.	1.684	0.0296	0.0238	333.84
706	1575.	12.	47.	820.	16.0	175.	97.	6.	1.663	0.0295	0.0238	310.26
706	1575.	12.	47.	820.	16.0	175.	97.	6.	1.673	0.0274	0.0217	374.62
706	1575.	12.	47.	820.	16.0	175.	97.	6.	1.708	0.0284	0.0225	362.65
801	1860.	6.	47.	400.	16.0	77.	96.	1.	1.657	0.0283	0.0226	618.06
801	1860.	6.	47.	400.	16.0	77.	96.	1.	1.682	0.0283	0.0225	660.20
801	1860.	6.	47.	400.	16.0	77.	96.	1.	1.712	0.0291	0.0232	597.83
801	1860.	6.	47.	400.	16.0	77.	96.	1.	1.674	0.0297	0.0240	446.38
801	1860.	6.	47.	400.	16.0	77.	96.	1.	1.693	0.0290	0.0232	481.57
801	1860.	6.	47.	400.	16.0	77.	96.	1.	1.703	0.0296	0.0238	462.24
802	1862.	6.	47.	400.	16.0	76.	95.	2.	1.672	0.0286	0.0229	591.41
802	1862.	6.	47.	400.	16.0	76.	95.	2.	1.708	0.0287	0.0228	628.27
802	1862.	6.	47.	400.	16.0	76.	95.	2.	1.709	0.0289	0.0230	592.67
802	1862.	6.	47.	400.	16.0	76.	95.	2.	1.715	0.0283	0.0224	632.11
802	1862.	6.	47.	400.	16.0	76.	95.	2.	1.704	0.0280	0.0222	631.38
802	1862.	6.	47.	400.	16.0	76.	95.	2.	1.680	0.0283	0.0225	533.78
802	1862.	6.	47.	400.	16.0	76.	95.	2.	1.693	0.0292	0.0234	488.19
802	1862.	6.	47.	400.	16.0	76.	95.	2.	1.669	0.0288	0.0231	434.03
802	1862.	6.	47.	400.	16.0	76.	95.	2.	1.682	0.0293	0.0235	511.07
803	1861.	6.	47.	400.	16.0	75.	95.	3.	1.700	0.0284	0.0226	613.72
803	1861.	6.	47.	400.	16.0	75.	95.	3.	1.679	0.0281	0.0223	541.41
803	1861.	6.	47.	400.	16.0	75.	95.	3.	1.735	0.0285	0.0225	609.42
803	1861.	6.	47.	400.	16.0	75.	95.	3.	1.728	0.0277	0.0218	645.13
803	1861.	6.	47.	400.	16.0	75.	95.	3.	1.725	0.0263	0.0204	829.49
803	1861.	6.	47.	400.	16.0	75.	95.	3.	1.707	0.0281	0.0222	626.89
803	1861.	6.	47.	400.	16.0	75.	95.	3.	1.679	0.0286	0.0228	508.89
803	1861.	6.	47.	400.	16.0	75.	95.	3.	1.718	0.0280	0.0221	559.63
803	1861.	6.	47.	400.	16.0	75.	95.	3.	1.724	0.0290	0.0231	494.95
804	1860.	6.	47.	400.	16.0	76.	94.	4.	1.687	0.0278	0.0220	684.17
804	1860.	6.	47.	400.	16.0	76.	94.	4.	1.738	0.0268	0.0208	720.51
804	1860.	6.	47.	400.	16.0	76.	94.	4.	1.767	0.0286	0.0225	770.21
804	1860.	6.	47.	400.	16.0	76.	94.	4.	1.755	0.0291	0.0231	597.83
804	1860.	6.	47.	400.	16.0	76.	94.	4.	1.809	0.0284	0.0222	655.56
804	1860.	6.	47.	400.	16.0	76.	94.	4.	1.727	0.0291	0.0232	571.26
804	1860.	6.	47.	400.	16.0	76.	94.	4.	1.728	0.0298	0.0239	430.72
804	1860.	6.	47.	400.	16.0	76.	94.	4.	1.741	0.0307	0.0247	417.78
804	1860.	6.	47.	400.	16.0	76.	94.	4.	1.722	0.0305	0.0246	459.55
805	1862.	6.	47.	400.	16.0	76.	94.	5.	1.643	0.0273	0.0217	573.60
805	1862.	6.	47.	400.	16.0	76.	94.	5.	1.675	0.0281	0.0224	612.64
805	1862.	6.	47.	400.	16.0	76.	94.	5.	1.694	0.0281	0.0223	584.15
805	1862.	6.	47.	400.	16.0	76.	94.	5.	1.680	0.0283	0.0225	589.97
805	1862.	6.	47.	400.	16.0	76.	94.	5.	1.755	0.0267	0.0207	694.36
805	1862.	6.	47.	400.	16.0	76.	94.	5.	1.653	0.0282	0.0225	523.43
805	1862.	6.	47.	400.	16.0	76.	94.	5.	1.670	0.0296	0.0239	385.20
805	1862.	6.	47.	400.	16.0	76.	94.	5.	1.699	0.0286	0.0228	495.13
805	1862.	6.	47.	400.	16.0	76.	94.	5.	1.673	0.0299	0.0242	390.10
806	1862.	6.	47.	400.	16.0	78.	95.	6.	1.687	0.0289	0.0231	552.26
806	1862.	6.	47.	400.	16.0	78.	95.	6.	1.699	0.0256	0.0198	635.15
806	1862.	6.	47.	400.	16.0	78.	95.	6.	1.702	0.0276	0.0218	635.04
806	1862.	6.	47.	400.	16.0	78.	95.	6.	1.643	0.0275	0.0219	505.79
806	1862.	6.	47.	400.	16.0	78.	95.	6.	1.653	0.0256	0.0199	635.15
806	1862.	6.	47.	400.	16.0	78.	95.	6.	1.612	0.0293	0.0238	366.92
806	1862.	6.	47.	400.	16.0	78.	95.	6.	1.635	0.0301	0.0245	459.43
806	1862.	6.	47.	400.	16.0	78.	95.	6.	1.628	0.0327	0.0271	378.76
806	1862.	6.	47.	400.	16.0	78.	95.	6.	1.644	0.0308	0.0252	403.21

PLAQUE STUDY-ANOVA INFO.   THICKNESS X 10   TABLE NO. 2-

GROUP 1,	DF = 8.,	SSQ = 0.000732,	MS(VAR) = 0.000091,	SIG = 0.00957,	MEAN = 0.28511
GROUP 2,	DF = 8.,	SSQ = 0.001794,	MS(VAR) = 0.000224,	SIG = 0.01497,	MEAN = 0.29144
GROUP 3,	DF = 8.,	SSQ = 0.000406,	MS(VAR) = 0.000050,	SIG = 0.00712,	MEAN = 0.30565
GROUP 4,	DF = 8.,	SSQ = 0.000164,	MS(VAR) = 0.000020,	SIG = 0.00452,	MEAN = 0.29899
GROUP 5,	DF = 8.,	SSQ = 0.000683,	MS(VAR) = 0.000085,	SIG = 0.00924,	MEAN = 0.30022
GROUP 6,	DF = 5.,	SSQ = 0.000275,	MS(VAR) = 0.000055,	SIG = 0.00742,	MEAN = 0.31449
GROUP 7,	DF = 8.,	SSQ = 0.000784,	MS(VAR) = 0.000098,	SIG = 0.00989,	MEAN = 0.29766
GROUP 8,	DF = 8.,	SSQ = 0.001490,	MS(VAR) = 0.000186,	SIG = 0.01364,	MEAN = 0.28655
GROUP 9,	DF = 8.,	SSQ = 0.002512,	MS(VAR) = 0.000314,	SIG = 0.01772,	MEAN = 0.29255
GROUP 10,	DF = 8.,	SSQ = 0.000521,	MS(VAR) = 0.000065,	SIG = 0.00807,	MEAN = 0.29722
GROUP 11,	DF = 8.,	SSQ = 0.000698,	MS(VAR) = 0.000087,	SIG = 0.00934,	MEAN = 0.30444
GROUP 12,	DF = 8.,	SSQ = 0.002527,	MS(VAR) = 0.000315,	SIG = 0.01777,	MEAN = 0.29122
GROUP 13,	DF = 8.,	SSQ = 0.000056,	MS(VAR) = 0.000007,	SIG = 0.00265,	MEAN = 0.28144
GROUP 14,	DF = 8.,	SSQ = 0.000205,	MS(VAR) = 0.000025,	SIG = 0.00506,	MEAN = 0.28577
GROUP 15,	DF = 8.,	SSQ = 0.000349,	MS(VAR) = 0.000043,	SIG = 0.00661,	MEAN = 0.28022
GROUP 16,	DF = 8.,	SSQ = 0.000276,	MS(VAR) = 0.000034,	SIG = 0.00587,	MEAN = 0.28644
GROUP 17,	DF = 8.,	SSQ = 0.000396,	MS(VAR) = 0.000049,	SIG = 0.00704,	MEAN = 0.27666
GROUP 18,	DF = 8.,	SSQ = 0.001048,	MS(VAR) = 0.000131,	SIG = 0.01144,	MEAN = 0.28499
GROUP 19,	DF = 8.,	SSQ = 0.001370,	MS(VAR) = 0.000171,	SIG = 0.01308,	MEAN = 0.28444
GROUP 20,	DF = 8.,	SSQ = 0.000640,	MS(VAR) = 0.000080,	SIG = 0.00895,	MEAN = 0.27411
GROUP 21,	DF = 8.,	SSQ = 0.000478,	MS(VAR) = 0.000059,	SIG = 0.00772,	MEAN = 0.27299
GROUP 22,	DF = 8.,	SSQ = 0.000043,	MS(VAR) = 0.000005,	SIG = 0.00233,	MEAN = 0.29222
GROUP 23,	DF = 8.,	SSQ = 0.000121,	MS(VAR) = 0.000015,	SIG = 0.00389,	MEAN = 0.28777
GROUP 24,	DF = 8.,	SSQ = 0.001464,	MS(VAR) = 0.000183,	SIG = 0.01352,	MEAN = 0.27666
GROUP 25,	DF = 8.,	SSQ = 0.000738,	MS(VAR) = 0.000092,	SIG = 0.00960,	MEAN = 0.29633
GROUP 26,	DF = 8.,	SSQ = 0.001110,	MS(VAR) = 0.000138,	SIG = 0.01177,	MEAN = 0.29499
GROUP 27,	DF = 8.,	SSQ = 0.001080,	MS(VAR) = 0.000135,	SIG = 0.01161,	MEAN = 0.31533
GROUP 28,	DF = 8.,	SSQ = 0.000372,	MS(VAR) = 0.000046,	SIG = 0.00681,	MEAN = 0.31599
GROUP 29,	DF = 8.,	SSQ = 0.003634,	MS(VAR) = 0.000454,	SIG = 0.02131,	MEAN = 0.29955
GROUP 30,	DF = 8.,	SSQ = 0.002982,	MS(VAR) = 0.000372,	SIG = 0.01930,	MEAN = 0.29955
GROUP 31,	DF = 8.,	SSQ = 0.001026,	MS(VAR) = 0.000128,	SIG = 0.01132,	MEAN = 0.32265
GROUP 32,	DF = 8.,	SSQ = 0.002720,	MS(VAR) = 0.000340,	SIG = 0.01844,	MEAN = 0.29911
GROUP 33,	DF = 8.,	SSQ = 0.002534,	MS(VAR) = 0.000316,	SIG = 0.01779,	MEAN = 0.31044
GROUP 34,	DF = 8.,	SSQ = 0.000680,	MS(VAR) = 0.000085,	SIG = 0.00922,	MEAN = 0.30055
GROUP 35,	DF = 8.,	SSQ = 0.000602,	MS(VAR) = 0.000075,	SIG = 0.00867,	MEAN = 0.30955
GROUP 36,	DF = 8.,	SSQ = 0.001022,	MS(VAR) = 0.000127,	SIG = 0.01130,	MEAN = 0.30799
GROUP 37,	DF = 8.,	SSQ = 0.000489,	MS(VAR) = 0.000061,	SIG = 0.00782,	MEAN = 0.28577
GROUP 38,	DF = 8.,	SSQ = 0.000140,	MS(VAR) = 0.000017,	SIG = 0.00418,	MEAN = 0.28655
GROUP 39,	DF = 8.,	SSQ = 0.001454,	MS(VAR) = 0.000181,	SIG = 0.01348,	MEAN = 0.27966
GROUP 40,	DF = 8.,	SSQ = 0.000570,	MS(VAR) = 0.000071,	SIG = 0.00844,	MEAN = 0.27911
GROUP 41,	DF = 8.,	SSQ = 0.000448,	MS(VAR) = 0.000056,	SIG = 0.00748,	MEAN = 0.28399
GROUP 42,	DF = 8.,	SSQ = 0.000086,	MS(VAR) = 0.000010,	SIG = 0.00327,	MEAN = 0.27955

TABLE NO. 2-A (cont'd)

GROUP 43, DF = 8.,	SSQ = 0.000929,	MS(VAR) = 0.000116,	SIG = 0.01077,	MEAN = 0.28022
GROUP 44, DF = 8.,	SSQ = 0.001085,	MS(VAR) = 0.000135,	SIG = 0.01154,	MEAN = 0.28422
GROUP 45, DF = 8.,	SSQ = 0.000349,	MS(VAR) = 0.000043,	SIG = 0.00651,	MEAN = 0.25777
GROUP 46, DF = 8.,	SSQ = 0.000660,	MS(VAR) = 0.000082,	SIG = 0.00908,	MEAN = 0.25944
GROUP 47, DF = 8.,	SSQ = 0.000526,	MS(VAR) = 0.000065,	SIG = 0.00811,	MEAN = 0.25236
GROUP 48, DF = 8.,	SSQ = 0.000501,	MS(VAR) = 0.000062,	SIG = 0.00791,	MEAN = 0.26322
GROUP 49, DF = 8.,	SSQ = 0.000532,	MS(VAR) = 0.000066,	SIG = 0.00815,	MEAN = 0.27033
GROUP 50, DF = 8.,	SSQ = 0.000581,	MS(VAR) = 0.000072,	SIG = 0.00852,	MEAN = 0.25977
GROUP 51, DF = 8.,	SSQ = 0.000412,	MS(VAR) = 0.000051,	SIG = 0.00718,	MEAN = 0.27211
GROUP 52, DF = 8.,	SSQ = 0.000283,	MS(VAR) = 0.000035,	SIG = 0.00595,	MEAN = 0.27177
GROUP 53, DF = 8.,	SSQ = 0.000292,	MS(VAR) = 0.000036,	SIG = 0.00605,	MEAN = 0.27311
GROUP 54, DF = 8.,	SSQ = 0.000263,	MS(VAR) = 0.000032,	SIG = 0.00573,	MEAN = 0.28077
GROUP 55, DF = 8.,	SSQ = 0.000350,	MS(VAR) = 0.000043,	SIG = 0.00661,	MEAN = 0.26555
GROUP 56, DF = 8.,	SSQ = 0.001798,	MS(VAR) = 0.000224,	SIG = 0.01499,	MEAN = 0.26144
GROUP 57, DF = 8.,	SSQ = 0.000896,	MS(VAR) = 0.000112,	SIG = 0.01058,	MEAN = 0.27144
GROUP 58, DF = 8.,	SSQ = 0.000505,	MS(VAR) = 0.000063,	SIG = 0.00794,	MEAN = 0.26522
GROUP 59, DF = 8.,	SSQ = 0.000698,	MS(VAR) = 0.000087,	SIG = 0.00934,	MEAN = 0.26144
GROUP 60, DF = 8.,	SSQ = 0.001210,	MS(VAR) = 0.000151,	SIG = 0.01229,	MEAN = 0.26555
GROUP 61, DF = 8.,	SSQ = 0.000538,	MS(VAR) = 0.000067,	SIG = 0.00820,	MEAN = 0.27211
GROUP 62, DF = 8.,	SSQ = 0.000125,	MS(VAR) = 0.000015,	SIG = 0.00396,	MEAN = 0.25722
GROUP 63, DF = 8.,	SSQ = 0.000276,	MS(VAR) = 0.000034,	SIG = 0.00587,	MEAN = 0.27133
GROUP 64, DF = 8.,	SSQ = 0.000712,	MS(VAR) = 0.000089,	SIG = 0.00943,	MEAN = 0.27011
GROUP 65, DF = 8.,	SSQ = 0.000326,	MS(VAR) = 0.000040,	SIG = 0.00638,	MEAN = 0.25044
GROUP 66, DF = 8.,	SSQ = 0.000756,	MS(VAR) = 0.000094,	SIG = 0.00972,	MEAN = 0.25266
GROUP 67, DF = 8.,	SSQ = 0.000142,	MS(VAR) = 0.000017,	SIG = 0.00421,	MEAN = 0.31999
GROUP 68, DF = 8.,	SSQ = 0.000755,	MS(VAR) = 0.000094,	SIG = 0.00971,	MEAN = 0.30922
GROUP 69, DF = 8.,	SSQ = 0.000994,	MS(VAR) = 0.000124,	SIG = 0.01115,	MEAN = 0.31866
GROUP 70, DF = 8.,	SSQ = 0.000629,	MS(VAR) = 0.000078,	SIG = 0.00887,	MEAN = 0.31122
GROUP 71, DF = 8.,	SSQ = 0.000274,	MS(VAR) = 0.000034,	SIG = 0.00585,	MEAN = 0.31633
GROUP 72, DF = 8.,	SSQ = 0.000752,	MS(VAR) = 0.000094,	SIG = 0.00969,	MEAN = 0.28999
GROUP 73, DF = 8.,	SSQ = 0.000184,	MS(VAR) = 0.000036,	SIG = 0.00606,	MEAN = 0.25999
GROUP 74, DF = 8.,	SSQ = 0.000147,	MS(VAR) = 0.000018,	SIG = 0.00429,	MEAN = 0.25677
GROUP 75, DF = 8.,	SSQ = 0.000471,	MS(VAR) = 0.000058,	SIG = 0.00767,	MEAN = 0.25077
GROUP 76, DF = 8.,	SSQ = 0.001259,	MS(VAR) = 0.000157,	SIG = 0.01254,	MEAN = 0.25977
GROUP 77, DF = 8.,	SSQ = 0.000798,	MS(VAR) = 0.000099,	SIG = 0.00999,	MEAN = 0.26311
GROUP 78, DF = 8.,	SSQ = 0.004463,	MS(VAR) = 0.000557,	SIG = 0.02362,	MEAN = 0.25677
TOTAL, DF = 695.,	SSQ = 0.2327125,	MS(VAR) = 0.000334,	SIG = 0.01829,	MEAN = 0.25504

WITHIN GR., DF = 618., SSQ = 0.06621593, MS = 0.00010715

BETWEEN GR. DF = 77., SSQ = 0.16649565, MS = 0.00216225

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 20.179

PLAQUE STUDY-ANOVA INFO.   THICKNESS X 10   TABLE NO. 2-B

	DF	SSQ	MS(VAR)	SIG	MEAN
GROUP 1	50.	0.007687	0.000153	0.01239	[illegible]
GROUP 2	53.	0.010256	0.000193	0.01391	[illegible]
GROUP 3	53.	0.003028	0.000057	0.00755	[illegible]
GROUP 4	53.	0.006936	0.000130	0.01144	[illegible]
GROUP 5	53.	0.013559	0.000255	0.01599	[illegible]
GROUP 6	53.	0.011798	0.000222	0.01492	[illegible]
GROUP 7	53.	0.005773	0.000108	0.01043	[illegible]
GROUP 8	53.	0.004572	0.000086	0.00928	[illegible]
GROUP 9	53.	0.004415	0.000083	0.00912	[illegible]
GROUP 10	53.	0.009219	0.000173	0.01318	[illegible]
GROUP 11	53.	0.005671	0.000107	0.01034	[illegible]
GROUP 12	53.	0.009314	0.000175	0.01325	[illegible]
GROUP 13	50.	0.007881	0.000157	0.01255	[illegible]
TOTAL	695.	0.2327123	0.000334	0.01829	[illegible]
WITHIN GR.	683.	0.10011559	0.00014658		
BETWEEN GR.	12.	0.13259645	0.01104970		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 75.382

PLAQUE STUDY-ANOVA INFO.   THICKNESS X 10   TABLE NO. 2-C

	DF	SSQ	MS(VAR)	SIG	MEAN
GROUP 1	104.	0.018221	0.000175	0.01323	[illegible]
GROUP 2	107.	0.010020	0.000093	0.00967	[illegible]
GROUP 3	107.	0.026058	0.000243	0.01560	[illegible]
GROUP 4	107.	0.010356	0.000096	0.00985	[illegible]
GROUP 5	107.	0.013854	0.000129	0.01137	[illegible]
GROUP 6	53.	0.005671	0.000107	0.01034	[illegible]
GROUP 7	53.	0.009314	0.000175	0.01325	[illegible]
GROUP 8	50.	0.007881	0.000157	0.01255	[illegible]
TOTAL	695.	0.2327126	0.000334	0.01829	[illegible]
WITHIN GR.	688.	0.10137892	0.00014735		
BETWEEN GR.	7.	0.13133372	0.01876196		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 127.326

[illegible] STUDY-ANOVA INFO. WEIGHT PER 2 SQ. IN. TABLE NO. [illegible]-A

GROUP 1,	DF = 8.,	SSQ = 0.012085,	MS(VAR) = 0.001510,	SIG = 0.03886,	MEAN = 1.66177
GROUP 2,	DF = 8.,	SSQ = 0.008102,	MS(VAR) = 0.001012,	SIG = 0.03182,	MEAN = 1.70153
GROUP 3,	DF = 8.,	SSQ = 0.014349,	MS(VAR) = 0.001793,	SIG = 0.04235,	MEAN = 1.71077
GROUP 4,	DF = 8.,	SSQ = 0.016193,	MS(VAR) = 0.002024,	SIG = 0.04499,	MEAN = 1.71177
GROUP 5,	DF = 8.,	SSQ = 0.008036,	MS(VAR) = 0.001004,	SIG = 0.03169,	MEAN = 1.71155
GROUP 6,	DF = 5.,	SSQ = 0.009063,	MS(VAR) = 0.001012,	SIG = 0.03182,	MEAN = 1.71300
GROUP 7,	DF = 8.,	SSQ = 0.001658,	MS(VAR) = 0.000207,	SIG = 0.01440,	MEAN = 1.65338
GROUP 8,	DF = 8.,	SSQ = 0.007740,	MS(VAR) = 0.000967,	SIG = 0.03110,	MEAN = 1.66379
GROUP 9,	DF = 8.,	SSQ = 0.002559,	MS(VAR) = 0.000319,	SIG = 0.01788,	MEAN = 1.69777
GROUP 10,	DF = 8.,	SSQ = 0.003416,	MS(VAR) = 0.000427,	SIG = 0.02066,	MEAN = 1.69511
GROUP 11,	DF = 8.,	SSQ = 0.008677,	MS(VAR) = 0.001084,	SIG = 0.03293,	MEAN = 1.66477
GROUP 12,	DF = 8.,	SSQ = 0.009464,	MS(VAR) = 0.001183,	SIG = 0.03439,	MEAN = 1.66679
GROUP 13,	DF = 8.,	SSQ = 0.006320,	MS(VAR) = 0.000790,	SIG = 0.02810,	MEAN = 1.67888
GROUP 14,	DF = 8.,	SSQ = 0.004444,	MS(VAR) = 0.000555,	SIG = 0.02357,	MEAN = 1.71088
GROUP 15,	DF = 8.,	SSQ = 0.032280,	MS(VAR) = 0.004035,	SIG = 0.06352,	MEAN = 1.72033
GROUP 16,	DF = 8.,	SSQ = 0.005348,	MS(VAR) = 0.000669,	SIG = 0.02585,	MEAN = 1.66233
GROUP 17,	DF = 8.,	SSQ = 0.033548,	MS(VAR) = 0.004193,	SIG = 0.06475,	MEAN = 1.73366
GROUP 18,	DF = 8.,	SSQ = 0.011031,	MS(VAR) = 0.001378,	SIG = 0.03713,	MEAN = 1.71177
GROUP 19,	DF = 8.,	SSQ = 0.015762,	MS(VAR) = 0.001970,	SIG = 0.04438,	MEAN = 1.72511
GROUP 20,	DF = 8.,	SSQ = 0.017209,	MS(VAR) = 0.002151,	SIG = 0.04638,	MEAN = 1.57277
GROUP 21,	DF = 8.,	SSQ = 0.012379,	MS(VAR) = 0.001547,	SIG = 0.03933,	MEAN = 1.70277
GROUP 22,	DF = 8.,	SSQ = 0.007007,	MS(VAR) = 0.000875,	SIG = 0.02959,	MEAN = 1.67022
GROUP 23,	DF = 8.,	SSQ = 0.008082,	MS(VAR) = 0.001010,	SIG = 0.03178,	MEAN = 1.69866
GROUP 24,	DF = 8.,	SSQ = 0.006028,	MS(VAR) = 0.000753,	SIG = 0.02745,	MEAN = 1.66999
GROUP 25,	DF = 8.,	SSQ = 0.009632,	MS(VAR) = 0.001204,	SIG = 0.03469,	MEAN = 1.71155
GROUP 26,	DF = 8.,	SSQ = 0.007160,	MS(VAR) = 0.000895,	SIG = 0.02991,	MEAN = 1.69779
GROUP 27,	DF = 8.,	SSQ = 0.003715,	MS(VAR) = 0.000464,	SIG = 0.02155,	MEAN = 1.67322
GROUP 28,	DF = 8.,	SSQ = 0.007084,	MS(VAR) = 0.000885,	SIG = 0.02975,	MEAN = 1.69144
GROUP 29,	DF = 8.,	SSQ = 0.007916,	MS(VAR) = 0.000989,	SIG = 0.03145,	MEAN = 1.66599
GROUP 30,	DF = 8.,	SSQ = 0.011483,	MS(VAR) = 0.001435,	SIG = 0.03788,	MEAN = 1.57122
GROUP 31,	DF = 8.,	SSQ = 0.003146,	MS(VAR) = 0.000393,	SIG = 0.01983,	MEAN = 1.68088
GROUP 32,	DF = 8.,	SSQ = 0.003750,	MS(VAR) = 0.000468,	SIG = 0.02165,	MEAN = 1.67033
GROUP 33,	DF = 8.,	SSQ = 0.004759,	MS(VAR) = 0.000594,	SIG = 0.02439,	MEAN = 1.67522
GROUP 34,	DF = 8.,	SSQ = 0.002990,	MS(VAR) = 0.000373,	SIG = 0.01933,	MEAN = 1.67000
GROUP 35,	DF = 8.,	SSQ = 0.009354,	MS(VAR) = 0.001169,	SIG = 0.03419,	MEAN = 1.57755
GROUP 36,	DF = 8.,	SSQ = 0.008463,	MS(VAR) = 0.001057,	SIG = 0.03252,	MEAN = 1.67722
GROUP 37,	DF = 8.,	SSQ = 0.005248,	MS(VAR) = 0.000656,	SIG = 0.02561,	MEAN = 1.67155
GROUP 38,	DF = 8.,	SSQ = 0.012872,	MS(VAR) = 0.001609,	SIG = 0.04011,	MEAN = 1.67079
GROUP 39,	DF = 8.,	SSQ = 0.006422,	MS(VAR) = 0.000802,	SIG = 0.02833,	MEAN = 1.67479
GROUP 40,	DF = 8.,	SSQ = 0.008375,	MS(VAR) = 0.001046,	SIG = 0.03235,	MEAN = 1.71722
GROUP 41,	DF = 8.,	SSQ = 0.008513,	MS(VAR) = 0.001064,	SIG = 0.03262,	MEAN = 1.70422
GROUP 42,	DF = 8.,	SSQ = 0.018472,	MS(VAR) = 0.002309,	SIG = 0.04805,	MEAN = 1.73933

TABLE NO 2.1-A (cont'd)

GROUP 43, DF = 8., SSQ =	0.006476, MS(VAR) =	0.000809, SIG =	0.02845, MEAN =	1.67099
GROUP 44, DF = 8., SSQ =	0.004163, MS(VAR) =	0.000520, SIG =	0.02281, MEAN =	1.65677
GROUP 45, DF = 8., SSQ =	0.002816, MS(VAR) =	0.000352, SIG =	0.01876, MEAN =	1.71511
GROUP 46, DF = 8., SSQ =	0.036987, MS(VAR) =	0.004623, SIG =	0.06799, MEAN =	1.64977
GROUP 47, DF = 8., SSQ =	0.004180, MS(VAR) =	0.000522, SIG =	0.02285, MEAN =	1.66155
GROUP 48, DF = 8., SSQ =	0.009980, MS(VAR) =	0.001247, SIG =	0.03532, MEAN =	1.67599
GROUP 49, DF = 8., SSQ =	0.009490, MS(VAR) =	0.001186, SIG =	0.03444, MEAN =	1.69144
GROUP 50, DF = 8., SSQ =	0.021558, MS(VAR) =	0.002694, SIG =	0.05191, MEAN =	1.67755
GROUP 51, DF = 8., SSQ =	0.061318, MS(VAR) =	0.007664, SIG =	0.08754, MEAN =	1.71911
GROUP 52, DF = 8., SSQ =	0.036463, MS(VAR) =	0.004557, SIG =	0.06751, MEAN =	1.73822
GROUP 53, DF = 8., SSQ =	0.050336, MS(VAR) =	0.006292, SIG =	0.07932, MEAN =	1.77533
GROUP 54, DF = 8., SSQ =	0.003358, MS(VAR) =	0.000419, SIG =	0.02049, MEAN =	1.70411
GROUP 55, DF = 8., SSQ =	0.007725, MS(VAR) =	0.000965, SIG =	0.03107, MEAN =	1.65299
GROUP 56, DF = 8., SSQ =	0.002757, MS(VAR) =	0.000344, SIG =	0.01856, MEAN =	1.67122
GROUP 57, DF = 8., SSQ =	0.008099, MS(VAR) =	0.001012, SIG =	0.03181, MEAN =	1.67377
GROUP 58, DF = 8., SSQ =	0.002282, MS(VAR) =	0.000285, SIG =	0.01689, MEAN =	1.66344
GROUP 59, DF = 8., SSQ =	0.005230, MS(VAR) =	0.000653, SIG =	0.02556, MEAN =	1.65733
GROUP 60, DF = 8., SSQ =	0.002944, MS(VAR) =	0.000368, SIG =	0.01918, MEAN =	1.66055
GROUP 61, DF = 8., SSQ =	0.006062, MS(VAR) =	0.000757, SIG =	0.02752, MEAN =	1.67711
GROUP 62, DF = 8., SSQ =	0.004841, MS(VAR) =	0.000605, SIG =	0.02460, MEAN =	1.76677
GROUP 63, DF = 8., SSQ =	0.007464, MS(VAR) =	0.000933, SIG =	0.03055, MEAN =	1.70311
GROUP 64, DF = 8., SSQ =	0.011578, MS(VAR) =	0.001447, SIG =	0.03804, MEAN =	1.71244
GROUP 65, DF = 8., SSQ =	0.003207, MS(VAR) =	0.000400, SIG =	0.02002, MEAN =	1.71522
GROUP 66, DF = 8., SSQ =	0.002718, MS(VAR) =	0.000339, SIG =	0.01843, MEAN =	1.66666
GROUP 67, DF = 8., SSQ =	0.016456, MS(VAR) =	0.002057, SIG =	0.04535, MEAN =	1.69111
GROUP 68, DF = 8., SSQ =	0.017199, MS(VAR) =	0.002149, SIG =	0.04636, MEAN =	1.67077
GROUP 69, DF = 8., SSQ =	0.026067, MS(VAR) =	0.003258, SIG =	0.05708, MEAN =	1.74077
GROUP 70, DF = 8., SSQ =	0.006280, MS(VAR) =	0.000785, SIG =	0.02801, MEAN =	1.67955
GROUP 71, DF = 8., SSQ =	0.003262, MS(VAR) =	0.000407, SIG =	0.02019, MEAN =	1.64155
GROUP 72, DF = 8., SSQ =	0.004250, MS(VAR) =	0.000531, SIG =	0.02304, MEAN =	1.56655
GROUP 73, DF = 5., SSQ =	0.002010, MS(VAR) =	0.000402, SIG =	0.02005, MEAN =	1.56633
GROUP 74, DF = 8., SSQ =	0.002390, MS(VAR) =	0.000298, SIG =	0.01728, MEAN =	1.59244
GROUP 75, DF = 8., SSQ =	0.003462, MS(VAR) =	0.000432, SIG =	0.02080, MEAN =	1.71055
GROUP 76, DF = 8., SSQ =	0.009144, MS(VAR) =	0.001143, SIG =	0.03380, MEAN =	1.74155
GROUP 77, DF = 8., SSQ =	0.008400, MS(VAR) =	0.001050, SIG =	0.03240, MEAN =	1.68244
GROUP 78, DF = 8., SSQ =	0.008408, MS(VAR) =	0.001051, SIG =	0.03242, MEAN =	1.69566
TOTAL, DF = 695., SSQ =	1.2692451, MS(VAR) =	0.001826, SIG =	0.04273, MEAN =	1.63779
WITHIN GR., DF = 618., SSQ =	0.81553512, MS =	0.00131963		
BETWEEN GR. DF = 77., SSQ =	0.45371001, MS =	0.00589233		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 4.465

PLAQUE STUDY-ANOVA INFO. WEIGHT PER 2 SQ. IN. TABLE NO. 2.1-B

GROUP 1,	DF = 50.,	SSQ = 0.070305,	MS(VAR) = 0.001406,	SIG = 0.03749,	MEAN = 1.70438
GROUP 2,	DF = 53.,	SSQ = 0.049030,	MS(VAR) = 0.000925,	SIG = 0.03041,	MEAN = 1.67442
GROUP 3,	DF = 53.,	SSQ = 0.120784,	MS(VAR) = 0.002278,	SIG = 0.04773,	MEAN = [illegible]
GROUP 4,	DF = 53.,	SSQ = 0.097986,	MS(VAR) = 0.001848,	SIG = 0.04299,	MEAN = 1.68508
GROUP 5,	DF = 53.,	SSQ = 0.060362,	MS(VAR) = 0.001138,	SIG = 0.03374,	MEAN = 1.68370
GROUP 6,	DF = 53.,	SSQ = 0.033744,	MS(VAR) = 0.000636,	SIG = 0.02523,	MEAN = 1.67738
GROUP 7,	DF = 53.,	SSQ = 0.090289,	MS(VAR) = 0.001703,	SIG = 0.04127,	MEAN = 1.69972
GROUP 8,	DF = 53.,	SSQ = 0.087712,	MS(VAR) = 0.001654,	SIG = 0.04068,	MEAN = 1.67337
GROUP 9,	DF = 53.,	SSQ = 0.238600,	MS(VAR) = 0.004501,	SIG = 0.06709,	MEAN = 1.71702
GROUP 10,	DF = 53.,	SSQ = 0.031919,	MS(VAR) = 0.000602,	SIG = 0.02454,	MEAN = 1.66422
GROUP 11,	DF = 53.,	SSQ = 0.054050,	MS(VAR) = 0.001019,	SIG = 0.03193,	MEAN = 1.69535
GROUP 12,	DF = 53.,	SSQ = 0.118810,	MS(VAR) = 0.002241,	SIG = 0.04734,	MEAN = 1.68838
GROUP 13,	DF = 50.,	SSQ = 0.071138,	MS(VAR) = 0.001422,	SIG = 0.03771,	MEAN = 1.69543
TOTAL,	DF = 695.,	SSQ = 1.2692337,	MS(VAR) = 0.001826,	SIG = 0.04273,	MEAN = 1.68975
WITHIN GR.,	DF = 683.,	SSQ = 1.12473464,	MS = 0.00164675		
BETWEEN GR.,	DF = 12.,	SSQ = 0.14449908,	MS = 0.01204158		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 7.312

PLAQUE STUDY-ANOVA INFO. WEIGHT PER 2 SQ. IN. TABLE NO. 2.1-C

GROUP 1,	DF = 104.,	SSQ = 0.143200,	MS(VAR) = 0.001376,	SIG = 0.03710,	MEAN = 1.66907
GROUP 2,	DF = 107.,	SSQ = 0.229997,	MS(VAR) = 0.002149,	SIG = 0.04636,	MEAN = 1.67406
GROUP 3,	DF = 107.,	SSQ = 0.095977,	MS(VAR) = 0.000896,	SIG = 0.02994,	MEAN = 1.68134
GROUP 4,	DF = 107.,	SSQ = 0.194015,	MS(VAR) = 0.001813,	SIG = 0.04258,	MEAN = 1.68734
GROUP 5,	DF = 107.,	SSQ = 0.347535,	MS(VAR) = 0.003247,	SIG = 0.05699,	MEAN = 1.67072
GROUP 6,	DF = 53.,	SSQ = 0.054050,	MS(VAR) = 0.001019,	SIG = 0.03193,	MEAN = 1.69565
GROUP 7,	DF = 53.,	SSQ = 0.118810,	MS(VAR) = 0.002241,	SIG = 0.04734,	MEAN = 1.68836
GROUP 8,	DF = 50.,	SSQ = 0.071138,	MS(VAR) = 0.001422,	SIG = 0.03771,	MEAN = 1.69343
TOTAL,	DF = 695.,	SSQ = 1.2692470,	MS(VAR) = 0.001826,	SIG = 0.04273,	MEAN = 1.68975
WITHIN GR.,	DF = 688.,	SSQ = 1.25472593,	MS = 0.00182372		
BETWEEN GR.,	DF = 7.,	SSQ = 0.01452112,	MS = 0.00207444		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 1.137

PLAQUE STUDY-ANOVA INFO. VOID X 10   TABLE NO. 3-A

```
GROUP  1, DF =  8., SSQ =   0.000616, MS(VAR) =   0.000077, SIG =   0.00877, MEAN =   0.22655
GROUP  2, DF =  8., SSQ =   0.001742, MS(VAR) =   0.000217, SIG =   0.01476, MEAN =   0.23311
GROUP  3, DF =  8., SSQ =   0.000394, MS(VAR) =   0.000049, SIG =   0.00701, MEAN =   0.24479
GROUP  4, DF =  8., SSQ =   0.000214, MS(VAR) =   0.000026, SIG =   0.00517, MEAN =   0.24044
GROUP  5, DF =  8., SSQ =   0.000708, MS(VAR) =   0.000088, SIG =   0.00940, MEAN =   0.24155
GROUP  6, DF =  5., SSQ =   0.000281, MS(VAR) =   0.000056, SIG =   0.00750, MEAN =   0.25566
GROUP  7, DF =  8., SSQ =   0.000706, MS(VAR) =   0.000088, SIG =   0.00939, MEAN =   0.24079
GROUP  8, DF =  8., SSQ =   0.001586, MS(VAR) =   0.000198, SIG =   0.01408, MEAN =   0.22955
GROUP  9, DF =  8., SSQ =   0.002532, MS(VAR) =   0.000316, SIG =   0.01779, MEAN =   0.23466
GROUP 10, DF =  8., SSQ =   0.000512, MS(VAR) =   0.000064, SIG =   0.00800, MEAN =   0.23911
GROUP 11, DF =  8., SSQ =   0.000583, MS(VAR) =   0.000072, SIG =   0.00854, MEAN =   0.24722
GROUP 12, DF =  8., SSQ =   0.002360, MS(VAR) =   0.000295, SIG =   0.01717, MEAN =   0.23399
GROUP 13, DF =  8., SSQ =   0.000038, MS(VAR) =   0.000004, SIG =   0.00220, MEAN =   0.22366
GROUP 14, DF =  8., SSQ =   0.000210, MS(VAR) =   0.000026, SIG =   0.00513, MEAN =   0.22811
GROUP 15, DF =  8., SSQ =   0.000415, MS(VAR) =   0.000051, SIG =   0.00720, MEAN =   0.22122
GROUP 16, DF =  8., SSQ =   0.000259, MS(VAR) =   0.000032, SIG =   0.00569, MEAN =   0.22922
GROUP 17, DF =  8., SSQ =   0.000242, MS(VAR) =   0.000030, SIG =   0.00550, MEAN =   0.21755
GROUP 18, DF =  8., SSQ =   0.001016, MS(VAR) =   0.000127, SIG =   0.01126, MEAN =   0.22633
GROUP 19, DF =  8., SSQ =   0.001171, MS(VAR) =   0.000146, SIG =   0.01210, MEAN =   0.22922
GROUP 20, DF =  8., SSQ =   0.000644, MS(VAR) =   0.000080, SIG =   0.00897, MEAN =   0.21666
GROUP 21, DF =  8., SSQ =   0.000500, MS(VAR) =   0.000062, SIG =   0.00790, MEAN =   0.21466
GROUP 22, DF =  8., SSQ =   0.000040, MS(VAR) =   0.000005, SIG =   0.00226, MEAN =   0.23438
GROUP 23, DF =  8., SSQ =   0.000123, MS(VAR) =   0.000015, SIG =   0.00392, MEAN =   0.23077
GROUP 24, DF =  8., SSQ =   0.001388, MS(VAR) =   0.000173, SIG =   0.01317, MEAN =   0.21944
GROUP 25, DF =  8., SSQ =   0.000779, MS(VAR) =   0.000097, SIG =   0.00987, MEAN =   0.23177
GROUP 26, DF =  8., SSQ =   0.001102, MS(VAR) =   0.000137, SIG =   0.01173, MEAN =   0.25666
GROUP 27, DF =  8., SSQ =   0.001003, MS(VAR) =   0.000125, SIG =   0.01120, MEAN =   0.23777
GROUP 28, DF =  8., SSQ =   0.000358, MS(VAR) =   0.000044, SIG =   0.00663, MEAN =   0.23566
GROUP 29, DF =  8., SSQ =   0.003850, MS(VAR) =   0.000481, SIG =   0.02193, MEAN =   0.24233
GROUP 30, DF =  8., SSQ =   0.003167, MS(VAR) =   0.000395, SIG =   0.01987, MEAN =   0.24422
GROUP 31, DF =  8., SSQ =   0.001028, MS(VAR) =   0.000128, SIG =   0.01133, MEAN =   0.25433
GROUP 32, DF =  8., SSQ =   0.002688, MS(VAR) =   0.000336, SIG =   0.01833, MEAN =   0.24177
GROUP 33, DF =  8., SSQ =   0.002394, MS(VAR) =   0.000299, SIG =   0.01729, MEAN =   0.25277
GROUP 34, DF =  8., SSQ =   0.000672, MS(VAR) =   0.000084, SIG =   0.00917, MEAN =   0.24311
GROUP 35, DF =  8., SSQ =   0.000557, MS(VAR) =   0.000069, SIG =   0.00834, MEAN =   0.25222
GROUP 36, DF =  8., SSQ =   0.000918, MS(VAR) =   0.000114, SIG =   0.01071, MEAN =   0.23344
GROUP 37, DF =  8., SSQ =   0.000488, MS(VAR) =   0.000061, SIG =   0.00781, MEAN =   0.22544
GROUP 38, DF =  8., SSQ =   0.000154, MS(VAR) =   0.000019, SIG =   0.00439, MEAN =   0.22833
GROUP 39, DF =  8., SSQ =   0.001479, MS(VAR) =   0.000184, SIG =   0.01360, MEAN =   0.22233
GROUP 40, DF =  8., SSQ =   0.000540, MS(VAR) =   0.000067, SIG =   0.00822, MEAN =   0.22011
GROUP 41, DF =  8., SSQ =   0.000474, MS(VAR) =   0.000059, SIG =   0.00769, MEAN =   0.22255
GROUP 42, DF =  8., SSQ =   0.000100, MS(VAR) =   0.000012, SIG =   0.00353, MEAN =   0.23966
```

TABLE NO. 3-A (cont'd)

GROUP 43, DF = 8.,	SSQ = 0.000922,	MS(VAR) = 0.000115,	SIG = 0.01074,	MEAN = 0.22258
GROUP 44, DF = 8.,	SSQ = 0.001053,	MS(VAR) = 0.000131,	SIG = 0.01147,	MEAN = 0.22722
GROUP 45, DF = 8.,	SSQ = 0.000344,	MS(VAR) = 0.000043,	SIG = 0.00656,	MEAN = 0.22608
GROUP 46, DF = 8.,	SSQ = 0.000640,	MS(VAR) = 0.000080,	SIG = 0.00895,	MEAN = 0.23238
GROUP 47, DF = 8.,	SSQ = 0.000474,	MS(VAR) = 0.000059,	SIG = 0.00769,	MEAN = 0.22533
GROUP 48, DF = 8.,	SSQ = 0.000506,	MS(VAR) = 0.000063,	SIG = 0.00795,	MEAN = 0.22566
GROUP 49, DF = 8.,	SSQ = 0.000588,	MS(VAR) = 0.000073,	SIG = 0.00857,	MEAN = 0.21233
GROUP 50, DF = 8.,	SSQ = 0.000400,	MS(VAR) = 0.000050,	SIG = 0.00707,	MEAN = 0.20213
GROUP 51, DF = 8.,	SSQ = 0.000275,	MS(VAR) = 0.000034,	SIG = 0.00586,	MEAN = 0.21322
GROUP 52, DF = 8.,	SSQ = 0.000139,	MS(VAR) = 0.000017,	SIG = 0.00417,	MEAN = 0.21222
GROUP 53, DF = 8.,	SSQ = 0.000368,	MS(VAR) = 0.000046,	SIG = 0.00678,	MEAN = 0.21233
GROUP 54, DF = 8.,	SSQ = 0.000288,	MS(VAR) = 0.000036,	SIG = 0.00600,	MEAN = 0.22233
GROUP 55, DF = 8.,	SSQ = 0.000326,	MS(VAR) = 0.000040,	SIG = 0.00639,	MEAN = 0.20855
GROUP 56, DF = 8.,	SSQ = 0.001822,	MS(VAR) = 0.000227,	SIG = 0.01509,	MEAN = 0.20411
GROUP 57, DF = 8.,	SSQ = 0.000868,	MS(VAR) = 0.000108,	SIG = 0.01041,	MEAN = 0.21379
GROUP 58, DF = 8.,	SSQ = 0.000548,	MS(VAR) = 0.000068,	SIG = 0.00828,	MEAN = 0.20611
GROUP 59, DF = 8.,	SSQ = 0.000680,	MS(VAR) = 0.000085,	SIG = 0.00922,	MEAN = [illegible]
GROUP 60, DF = 8.,	SSQ = 0.001194,	MS(VAR) = 0.000149,	SIG = 0.01221,	MEAN = 0.22033
GROUP 61, DF = 8.,	SSQ = 0.000448,	MS(VAR) = 0.000056,	SIG = 0.00748,	MEAN = 0.21444
GROUP 62, DF = 8.,	SSQ = 0.000128,	MS(VAR) = 0.000016,	SIG = 0.00400,	MEAN = 0.19355
GROUP 63, DF = 8.,	SSQ = 0.000294,	MS(VAR) = 0.000036,	SIG = 0.00607,	MEAN = 0.21311
GROUP 64, DF = 8.,	SSQ = 0.000766,	MS(VAR) = 0.000095,	SIG = 0.00978,	MEAN = 0.21114
GROUP 65, DF = 8.,	SSQ = 0.000335,	MS(VAR) = 0.000041,	SIG = 0.00647,	MEAN = 0.22177
GROUP 66, DF = 8.,	SSQ = 0.000726,	MS(VAR) = 0.000090,	SIG = 0.00952,	MEAN = 0.20555
GROUP 67, DF = 8.,	SSQ = 0.000134,	MS(VAR) = 0.000016,	SIG = 0.00410,	MEAN = 0.20211
GROUP 68, DF = 8.,	SSQ = 0.000682,	MS(VAR) = 0.000085,	SIG = 0.00923,	MEAN = 0.25133
GROUP 69, DF = 8.,	SSQ = 0.000831,	MS(VAR) = 0.000103,	SIG = 0.01019,	MEAN = 0.23922
GROUP 70, DF = 8.,	SSQ = 0.000684,	MS(VAR) = 0.000085,	SIG = 0.00924,	MEAN = 0.23333
GROUP 71, DF = 8.,	SSQ = 0.000284,	MS(VAR) = 0.000035,	SIG = 0.00596,	MEAN = 0.20185
GROUP 72, DF = 8.,	SSQ = 0.000700,	MS(VAR) = 0.000087,	SIG = 0.00936,	MEAN = 0.23211
GROUP 73, DF = 5.,	SSQ = 0.000184,	MS(VAR) = 0.000036,	SIG = 0.00608,	MEAN = 0.23216
GROUP 74, DF = 8.,	SSQ = 0.000156,	MS(VAR) = 0.000019,	SIG = 0.00441,	MEAN = 0.22800
GROUP 75, DF = 8.,	SSQ = 0.000484,	MS(VAR) = 0.000060,	SIG = 0.00777,	MEAN = 0.22179
GROUP 76, DF = 8.,	SSQ = 0.001304,	MS(VAR) = 0.000163,	SIG = 0.01276,	MEAN = [illegible]
GROUP 77, DF = 8.,	SSQ = 0.000884,	MS(VAR) = 0.000110,	SIG = 0.01051,	MEAN = 0.22999
GROUP 78, DF = 8.,	SSQ = 0.004704,	MS(VAR) = 0.000588,	SIG = 0.02425,	MEAN = 0.23011
TOTAL, DF = 695.,	SSQ = 0.2328654,	MS(VAR) = 0.000335,	SIG = 0.01830,	MEAN = 0.23009

WITHIN GR., DF = 618., SSQ = 0.06522423, MS = 0.00010554

BETWEEN GR, DF = 77., SSQ = 0.16764121, MS = 0.00217715

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 20.628

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PLAQUE STUDY-ANOVA INFO. VOID X 10   TABLE NO. 3-B

GROUP 1,	DF = 50.,	SSQ = 0.007282,	MS(VAR) = 0.000145,	SIG = 0.01206,	MEAN = 0.23964
GROUP 2,	DF = 53.,	SSQ = 0.010015,	MS(VAR) = 0.000188,	SIG = 0.01374,	MEAN = 0.23759
GROUP 3,	DF = 53.,	SSQ = 0.003092,	MS(VAR) = 0.000058,	SIG = 0.00763,	MEAN = 0.22435
GROUP 4,	DF = 53.,	SSQ = 0.006808,	MS(VAR) = 0.000128,	SIG = 0.01133,	MEAN = 0.22301
GROUP 5,	DF = 53.,	SSQ = 0.014015,	MS(VAR) = 0.000264,	SIG = 0.01626,	MEAN = 0.24944
GROUP 6,	DF = 53.,	SSQ = 0.011280,	MS(VAR) = 0.000212,	SIG = 0.01458,	MEAN = 0.25090
GROUP 7,	DF = 53.,	SSQ = 0.005540,	MS(VAR) = 0.000104,	SIG = 0.01022,	MEAN = 0.22690
GROUP 8,	DF = 53.,	SSQ = 0.004478,	MS(VAR) = 0.000084,	SIG = 0.00919,	MEAN = 0.22714
GROUP 9,	DF = 53.,	SSQ = 0.003865,	MS(VAR) = 0.000072,	SIG = 0.00854,	MEAN = 0.21246
GROUP 10,	DF = 53.,	SSQ = 0.009136,	MS(VAR) = 0.000172,	SIG = 0.01312,	MEAN = 0.21133
GROUP 11,	DF = 53.,	SSQ = 0.005552,	MS(VAR) = 0.000104,	SIG = 0.01023,	MEAN = 0.21061
GROUP 12,	DF = 53.,	SSQ = 0.009072,	MS(VAR) = 0.000171,	SIG = 0.01308,	MEAN = 0.25537
GROUP 13,	DF = 50.,	SSQ = 0.008278,	MS(VAR) = 0.000165,	SIG = 0.01286,	MEAN = 0.22764
TOTAL,	DF = 695.,	SSQ = 0.2328653,	MS(VAR) = 0.000335,	SIG = 0.01830,	MEAN = 0.23009
WITHIN GR.,	DF = 683.,	SSQ = 0.09841940,	MS = 0.00014409		
BETWEEN GR,	DF = 12.,	SSQ = 0.13444598,	MS = 0.01120383		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) 77.751

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PLAQUE STUDY-ANOVA INFO. VOID X 10   TABLE NO. 3-C

GROUP 1,	DF = 104.,	SSQ = 0.017430,	MS(VAR) = 0.000167,	SIG = 0.01294,	MEAN = 0.23806
GROUP 2,	DF = 107.,	SSQ = 0.009916,	MS(VAR) = 0.000092,	SIG = 0.00962,	MEAN = 0.24376
GROUP 3,	DF = 107.,	SSQ = 0.026101,	MS(VAR) = 0.000243,	SIG = 0.01561,	MEAN = 0.24817
GROUP 4,	DF = 107.,	SSQ = 0.010021,	MS(VAR) = 0.000093,	SIG = 0.00967,	MEAN = 0.22702
GROUP 5,	DF = 107.,	SSQ = 0.013035,	MS(VAR) = 0.000121,	SIG = 0.01103,	MEAN = 0.21139
GROUP 6,	DF = 53.,	SSQ = 0.005552,	MS(VAR) = 0.000104,	SIG = 0.01023,	MEAN = 0.21061
GROUP 7,	DF = 53.,	SSQ = 0.009072,	MS(VAR) = 0.000171,	SIG = 0.01308,	MEAN = 0.25537
GROUP 8,	DF = 50.,	SSQ = 0.008278,	MS(VAR) = 0.000165,	SIG = 0.01286,	MEAN = 0.22764
TOTAL,	DF = 695.,	SSQ = 0.2328656,	MS(VAR) = 0.000335,	SIG = 0.01830,	MEAN = 0.23009
WITHIN GR.,	DF = 688.,	SSQ = 0.09940919,	MS = 0.00014449		
BETWEEN GR,	DF = 7.,	SSQ = 0.13345646,	MS = 0.01906520		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 131.948

PLAQUE STUDY-ANOVA INFO. STRENGTH X .01 TABLE NO. 4-A

GROUP 1,	DF = 8.,	SSQ = 0.481929,	MS(VAR) = 0.060241,	SIG = 0.24544,	MEAN = 4.08124
GROUP 2,	DF = 8.,	SSQ = 3.397953,	MS(VAR) = 0.424744,	SIG = 0.65172,	MEAN = 4.12004
GROUP 3,	DF = 8.,	SSQ = 0.578986,	MS(VAR) = 0.072373,	SIG = 0.26902,	MEAN = 3.81495
GROUP 4,	DF = 8.,	SSQ = 0.624001,	MS(VAR) = 0.078000,	SIG = 0.27928,	MEAN = 3.94193
GROUP 5,	DF = 8.,	SSQ = 1.657994,	MS(VAR) = 0.207249,	SIG = 0.45524,	MEAN = 4.13569
GROUP 6,	DF = 5.,	SSQ = 1.523972,	MS(VAR) = 0.304794,	SIG = 0.55208,	MEAN = 2.92438
GROUP 7,	DF = 8.,	SSQ = 1.707937,	MS(VAR) = 0.213492,	SIG = 0.46205,	MEAN = 3.90911
GROUP 8,	DF = 8.,	SSQ = 3.262168,	MS(VAR) = 0.407771,	SIG = 0.63856,	MEAN = 4.48369
GROUP 9,	DF = 8.,	SSQ = 5.048390,	MS(VAR) = 0.631048,	SIG = 0.79438,	MEAN = 4.30537
GROUP 10,	DF = 8.,	SSQ = 0.466164,	MS(VAR) = 0.058270,	SIG = 0.24139,	MEAN = 4.16559
GROUP 11,	DF = 8.,	SSQ = 0.320316,	MS(VAR) = 0.040039,	SIG = 0.20009,	MEAN = 3.65445
GROUP 12,	DF = 8.,	SSQ = 5.620429,	MS(VAR) = 0.702553,	SIG = 0.83818,	MEAN = 4.73775
GROUP 13,	DF = 8.,	SSQ = 0.866194,	MS(VAR) = 0.108274,	SIG = 0.32905,	MEAN = 5.22091
GROUP 14,	DF = 8.,	SSQ = 1.999498,	MS(VAR) = 0.249937,	SIG = 0.49993,	MEAN = 5.49232
GROUP 15,	DF = 8.,	SSQ = 4.107596,	MS(VAR) = 0.513449,	SIG = 0.71655,	MEAN = 5.97171
GROUP 16,	DF = 8.,	SSQ = 0.461788,	MS(VAR) = 0.057723,	SIG = 0.24025,	MEAN = 5.05819
GROUP 17,	DF = 8.,	SSQ = 2.989084,	MS(VAR) = 0.373635,	SIG = 0.61125,	MEAN = 5.64077
GROUP 18,	DF = 8.,	SSQ = 9.443210,	MS(VAR) = 1.180401,	SIG = 1.08646,	MEAN = 5.19675
GROUP 19,	DF = 8.,	SSQ = 4.760358,	MS(VAR) = 0.595044,	SIG = 0.77139,	MEAN = 5.72965
GROUP 20,	DF = 8.,	SSQ = 4.112162,	MS(VAR) = 0.514020,	SIG = 0.71695,	MEAN = 5.82325
GROUP 21,	DF = 8.,	SSQ = 4.483931,	MS(VAR) = 0.560491,	SIG = 0.74865,	MEAN = 5.37372
GROUP 22,	DF = 8.,	SSQ = 2.473345,	MS(VAR) = 0.309168,	SIG = 0.55602,	MEAN = 4.71479
GROUP 23,	DF = 8.,	SSQ = 0.571270,	MS(VAR) = 0.071408,	SIG = 0.26722,	MEAN = 5.01162
GROUP 24,	DF = 8.,	SSQ = 5.800431,	MS(VAR) = 0.725053,	SIG = 0.85150,	MEAN = 5.56299
GROUP 25,	DF = 8.,	SSQ = 1.027129,	MS(VAR) = 0.128391,	SIG = 0.35831,	MEAN = 4.21908
GROUP 26,	DF = 8.,	SSQ = 9.764681,	MS(VAR) = 1.220585,	SIG = 1.10480,	MEAN = 3.55277
GROUP 27,	DF = 8.,	SSQ = 3.008829,	MS(VAR) = 0.376103,	SIG = 0.61327,	MEAN = 2.95462
GROUP 28,	DF = 8.,	SSQ = 4.683035,	MS(VAR) = 0.585379,	SIG = 0.76510,	MEAN = 2.68694
GROUP 29,	DF = 8.,	SSQ = 9.258845,	MS(VAR) = 1.157355,	SIG = 1.07580,	MEAN = 3.07058
GROUP 30,	DF = 8.,	SSQ = 7.960250,	MS(VAR) = 0.995031,	SIG = 0.99751,	MEAN = 3.21731
GROUP 31,	DF = 8.,	SSQ = 2.094723,	MS(VAR) = 0.261840,	SIG = 0.51170,	MEAN = 2.11442
GROUP 32,	DF = 8.,	SSQ = 2.123844,	MS(VAR) = 0.265480,	SIG = 0.51524,	MEAN = 2.53791
GROUP 33,	DF = 8.,	SSQ = 1.033639,	MS(VAR) = 0.129204,	SIG = 0.35945,	MEAN = 2.27703
GROUP 34,	DF = 8.,	SSQ = 3.380366,	MS(VAR) = 0.422545,	SIG = 0.65003,	MEAN = 2.65098
GROUP 35,	DF = 8.,	SSQ = 2.020251,	MS(VAR) = 0.252531,	SIG = 0.50252,	MEAN = 2.45306
GROUP 36,	DF = 8.,	SSQ = 1.055491,	MS(VAR) = 0.131936,	SIG = 0.36323,	MEAN = 2.61342
GROUP 37,	DF = 8.,	SSQ = 1.323912,	MS(VAR) = 0.165489,	SIG = 0.40680,	MEAN = 5.07138
GROUP 38,	DF = 8.,	SSQ = 0.584665,	MS(VAR) = 0.073083,	SIG = 0.27033,	MEAN = 4.80828
GROUP 39,	DF = 8.,	SSQ = 6.028613,	MS(VAR) = 0.753576,	SIG = 0.86808,	MEAN = 5.92145
GROUP 40,	DF = 8.,	SSQ = 2.295181,	MS(VAR) = 0.286897,	SIG = 0.53562,	MEAN = 5.90734
GROUP 41,	DF = 8.,	SSQ = 1.571707,	MS(VAR) = 0.196463,	SIG = 0.44324,	MEAN = 5.00215
GROUP 42,	DF = 8.,	SSQ = 8.753175,	MS(VAR) = 1.094146,	SIG = 1.04601,	MEAN = 4.65724

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TABLE NO. 4-A (cont'd)

GROUP 43, DF =	8., SSQ =	4.147912, MS(VAR) =	0.518489, SIG =	0.72006, MEAN =	5.41169
GROUP 44, DF =	8., SSQ =	1.749126, MS(VAR) =	0.218640, SIG =	0.46759, MEAN =	4.84725
GROUP 45, DF =	8., SSQ =	2.819798, MS(VAR) =	0.352474, SIG =	0.59369, MEAN =	5.49854
GROUP 46, DF =	8., SSQ =	4.159665, MS(VAR) =	0.519958, SIG =	0.72109, MEAN =	4.80274
GROUP 47, DF =	8., SSQ =	2.349629, MS(VAR) =	0.293703, SIG =	0.54194, MEAN =	5.14412
GROUP 48, DF =	8., SSQ =	7.724686, MS(VAR) =	0.965585, SIG =	0.98264, MEAN =	5.28398
GROUP 49, DF =	8., SSQ =	4.816361, MS(VAR) =	0.602045, SIG =	0.77591, MEAN =	6.95476
GROUP 50, DF =	8., SSQ =	2.115664, MS(VAR) =	0.264458, SIG =	0.51425, MEAN =	7.06217
GROUP 51, DF =	8., SSQ =	9.310459, MS(VAR) =	1.163807, SIG =	1.07879, MEAN =	6.65005
GROUP 52, DF =	8., SSQ =	2.196590, MS(VAR) =	0.274573, SIG =	0.52399, MEAN =	6.95408
GROUP 53, DF =	8., SSQ =	12.759142, MS(VAR) =	1.594892, SIG =	1.26289, MEAN =	7.97276
GROUP 54, DF =	8., SSQ =	3.476549, MS(VAR) =	0.434568, SIG =	0.65921, MEAN =	6.53309
GROUP 55, DF =	8., SSQ =	1.767709, MS(VAR) =	0.220963, SIG =	0.47006, MEAN =	6.00423
GROUP 56, DF =	8., SSQ =	8.158446, MS(VAR) =	1.019805, SIG =	1.00985, MEAN =	7.15827
GROUP 57, DF =	8., SSQ =	2.702690, MS(VAR) =	0.337836, SIG =	0.58123, MEAN =	6.56511
GROUP 58, DF =	8., SSQ =	4.368293, MS(VAR) =	0.546036, SIG =	0.73894, MEAN =	7.18006
GROUP 59, DF =	8., SSQ =	6.482547, MS(VAR) =	0.810318, SIG =	0.90017, MEAN =	7.64157
GROUP 60, DF =	8., SSQ =	7.133220, MS(VAR) =	0.891652, SIG =	0.94427, MEAN =	5.32152
GROUP 61, DF =	8., SSQ =	0.304422, MS(VAR) =	0.038052, SIG =	0.19507, MEAN =	7.57117
GROUP 62, DF =	8., SSQ =	1.220488, MS(VAR) =	0.152561, SIG =	0.39059, MEAN =	9.09075
GROUP 63, DF =	8., SSQ =	1.986633, MS(VAR) =	0.248329, SIG =	0.49832, MEAN =	8.25643
GROUP 64, DF =	8., SSQ =	9.528457, MS(VAR) =	1.191057, SIG =	1.09135, MEAN =	8.17563
GROUP 65, DF =	8., SSQ =	2.174090, MS(VAR) =	0.271761, SIG =	0.52130, MEAN =	7.57133
GROUP 66, DF =	8., SSQ =	2.855078, MS(VAR) =	0.356884, SIG =	0.59739, MEAN =	8.26401
GROUP 67, DF =	8., SSQ =	0.337518, MS(VAR) =	0.042189, SIG =	0.20540, MEAN =	2.52535
GROUP 68, DF =	8., SSQ =	1.237725, MS(VAR) =	0.154715, SIG =	0.39333, MEAN =	2.78355
GROUP 69, DF =	8., SSQ =	0.388082, MS(VAR) =	0.048510, SIG =	0.22025, MEAN =	2.67051
GROUP 70, DF =	8., SSQ =	1.806665, MS(VAR) =	0.225833, SIG =	0.47521, MEAN =	2.99678
GROUP 71, DF =	8., SSQ =	0.547304, MS(VAR) =	0.068413, SIG =	0.26155, MEAN =	2.39017
GROUP 72, DF =	8., SSQ =	0.397790, MS(VAR) =	0.049723, SIG =	0.22298, MEAN =	3.48445
GROUP 73, DF =	5., SSQ =	4.199595, MS(VAR) =	0.839919, SIG =	0.91647, MEAN =	5.44330
GROUP 74, DF =	8., SSQ =	4.111547, MS(VAR) =	0.513943, SIG =	0.71689, MEAN =	5.00343
GROUP 75, DF =	8., SSQ =	8.000459, MS(VAR) =	1.000057, SIG =	1.00002, MEAN =	6.03281
GROUP 76, DF =	8., SSQ =	13.513350, MS(VAR) =	1.689169, SIG =	1.29968, MEAN =	5.89732
GROUP 77, DF =	8., SSQ =	8.338520, MS(VAR) =	1.042315, SIG =	1.02093, MEAN =	5.58721
GROUP 78, DF =	8., SSQ =	10.038376, MS(VAR) =	1.254797, SIG =	1.12017, MEAN =	5.07757
TOTAL, DF =	695., SSQ =	2249.7757282, MS(VAR) =	3.237087, SIG =	1.79919, MEAN =	5.04307
WITHIN GR., DF =	618., SSQ =	293.95207011, MS =	0.47565059		
BETWEEN GR., DF =	77., SSQ =	1955.82365994, MS =	25.40030726		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 53.401

PLAQUE STUDY-ANOVA INFO. STRENGTH X .01 TABLE NO. 4-B

GROUP 1,	DF = 50.,	SSQ = 15.282694,	MS(VAR) = 0.305653,	SIG = 0.55285,	MEAN = [illegible]
GROUP 2,	DF = 53.,	SSQ = 23.920941,	MS(VAR) = 0.451338,	SIG = 0.67181,	MEAN = 4.26290
GROUP 3,	DF = 53.,	SSQ = 25.069608,	MS(VAR) = 0.473011,	SIG = 0.68775,	MEAN = 5.45014
GROUP 4,	DF = 53.,	SSQ = 30.373483,	MS(VAR) = 0.573084,	SIG = 0.75702,	MEAN = [illegible]
GROUP 5,	DF = 53.,	SSQ = 51.676529,	MS(VAR) = 0.975028,	SIG = 0.98743,	MEAN = [illegible]
GROUP 6,	DF = 53.,	SSQ = 13.601511,	MS(VAR) = 0.256632,	SIG = 0.50658,	MEAN = 2.44274
GROUP 7,	DF = 53.,	SSQ = 29.471827,	MS(VAR) = 0.556073,	SIG = 0.74570,	MEAN = [illegible]
GROUP 8,	DF = 53.,	SSQ = 29.759315,	MS(VAR) = 0.561496,	SIG = 0.74933,	MEAN = [illegible]
GROUP 9,	DF = 53.,	SSQ = 45.557340,	MS(VAR) = 0.859572,	SIG = 0.92713,	MEAN = 7.05272
GROUP 10,	DF = 53.,	SSQ = 52.610082,	MS(VAR) = 0.992643,	SIG = 0.99631,	MEAN = 6.09241
GROUP 11,	DF = 53.,	SSQ = 32.282911,	MS(VAR) = 0.609111,	SIG = 0.78045,	MEAN = 8.15500
GROUP 12,	DF = 53.,	SSQ = 11.760444,	MS(VAR) = 0.221895,	SIG = 0.47105,	MEAN = 2.63549
GROUP 13,	DF = 50.,	SSQ = 53.656523,	MS(VAR) = 1.073130,	SIG = 1.03592,	MEAN = 5.58108
TOTAL,	DF = 695.,	SSQ = 2249.7756977,	MS(VAR) = 3.237087,	SIG = 1.79919,	MEAN = 5.04307
WITHIN GR.,	DF = 683.,	SSQ = 415.02328598,	MS = 0.60764756		
BETWEEN GR,	DF = 12.,	SSQ = 1834.75241184,	MS = 152.89603435		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 251.619

PLAQUE STUDY-ANOVA INFO. STRENGTH X .01 TABLE NO. 4-C

GROUP 1,	DF = 104.,	SSQ = 42.845579,	MS(VAR) = 0.411976,	SIG = 0.64185,	MEAN = 4.08199
GROUP 2,	DF = 107.,	SSQ = 55.540287,	MS(VAR) = 0.517068,	SIG = 0.72046,	MEAN = 5.40014
GROUP 3,	DF = 107.,	SSQ = 80.375835,	MS(VAR) = 0.751176,	SIG = 0.86670,	MEAN = 2.81005
GROUP 4,	DF = 107.,	SSQ = 59.308416,	MS(VAR) = 0.554284,	SIG = 0.74450,	MEAN = 5.27125
GROUP 5,	DF = 107.,	SSQ = 102.498504,	MS(VAR) = 0.957929,	SIG = 0.97873,	MEAN = 6.89207
GROUP 6,	DF = 53.,	SSQ = 32.282911,	MS(VAR) = 0.609111,	SIG = 0.78045,	MEAN = 8.15566
GROUP 7,	DF = 53.,	SSQ = 11.760444,	MS(VAR) = 0.221895,	SIG = 0.47105,	MEAN = 2.63549
GROUP 8,	DF = 50.,	SSQ = 53.656523,	MS(VAR) = 1.073130,	SIG = 1.03592,	MEAN = 5.55108
TOTAL,	DF = 695.,	SSQ = 2249.7758197,	MS(VAR) = 3.237087,	SIG = 1.79919,	MEAN = 5.04307
WITHIN GR.,	DF = 688.,	SSQ = 438.26850199,	MS = 0.63701817		
BETWEEN GR,	DF = 7.,	SSQ = 1811.50731754,	MS = 258.78675973		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 406.247

TABLE NO. 5A
Strength Data Variable Designation

Number	Main Variables
Var 1	Temperature
Var 2	Belt. Speed
Var 3	Dew Point
Var 4	Atmosphere Amount
Var 5	Plaque Spacing
Var 6	1st Water Zone Temp.
Var 7	2nd Water Zone Temp.
Var 8	Plaque Sequence
Var 9	Thickness
Var 10	Response strength w/o Interactions
Var 37	Response strength with Interactions

INTERACTIONS

10 = 5 x 7	19 = 6 x 7	29 = 3 x 8
11 = 5 x 8	20 = 2 x 5	30 = 3 x 9
12 = 5 x 9	21 = 6 x 8	31 = 4 x 5
13 = 1 x 5	22 = 6 x 9	32 = 8 x 9
14 = 1 x 6	23 = 2 x 8	33 = 4 x 7
15 = 1 x 7	24 = 2 x 9	34 = 4 x 8
16 = 1 x 8	25 = 7 x 8	35 = 4 x 9
17 = 1 x 9	26 = 3 x 5	36 = 5 x 6
18 = 2 x 3	27 = 3 x 6	
	28 = 7 x 9	

PLAQUE STUDY   STRENGTH W/O INTERACTIONS   TABLE NO. 5B REGRESSION DATA

```
  CONTROL CARD USED FOR THIS REGRESSION
1310   0 7 2 0.000 0.000 0 0 51000 00 0 0010 00

  TRANSFORMATIONS SPECIFIED FOR THIS REGRESSION
 91212 1 91010 2 7121210 7371210 1 813 0 1 910 0 11037 0

  CONSTANT CARDS USED IN THIS REGRESSION
   1.125    0.100

 CODING MAX., VARIABLES IN NUMERICAL ORDER

   1868.000     12.000     54.000    820.000     16.000    180.000    112.000     6.000     0.034
 CODING MIN., VARIABLES IN NUMERICAL ORDER
   1575.000      6.000     20.000    330.000      0.100     72.000     83.000     1.000     0.023

AVERAGES
VAR( 1)=       0.2969, VAR( 2)=     -0.2241, VAR( 3)=      0.0955, VAR( 4)=     -0.0853,
VAR( 5)=      -0.0775, VAR( 6)=      0.0781, VAR( 7)=     -0.2812, VAR( 8)=      0.0000,
VAR( 9)=       0.0378, VAR(10)=    504.2924

STANDARD DEVIATIONS
VAR( 1)=       0.8355, VAR( 2)=      0.9752, VAR( 3)=      0.5909, VAR( 4)=      0.9235,
VAR( 5)=       0.9976, VAR( 6)=      0.9165, VAR( 7)=      0.4987, VAR( 8)=      0.6802,
VAR( 9)=       0.3388, VAR(10)=    179.9395

SIMPLE CORRELATION COEFFICIENTS
VARS( 1, 1)=  1.000001, VARS( 1, 2)=  0.261788, VARS( 1, 3)=  0.545688, VARS( 1, 4)= -0.293629,
VARS( 1, 5)= -0.262342, VARS( 1, 6)= -0.128441, VARS( 1, 7)=  0.407880, VARS( 1, 8)=  0.004603,
VARS( 1, 9)= -0.664428, VARS( 1,10)=  0.762156
VARS( 2, 2)=  1.000001, VARS( 2, 3)=  0.632436, VARS( 2, 4)=  0.189925, VARS( 2, 5)=  0.221655,
VARS( 2, 6)=  0.100863, VARS( 2, 7)=  0.577708, VARS( 2, 8)= -0.000000, VARS( 2, 9)=  0.044473,
VARS( 2,10)= -0.081250
VARS( 3, 3)=  1.000001, VARS( 3, 4)= -0.118545, VARS( 3, 5)=  0.221471, VARS( 3, 6)=  0.279250,
VARS( 3, 7)=  0.549487, VARS( 3, 8)=  0.018823, VARS( 3, 9)= -0.230425, VARS( 3,10)= -0.217002
VARS( 4, 4)=  1.000001, VARS( 4, 5)=  0.696236, VARS( 4, 6)=  0.525411, VARS( 4, 7)= -0.172018,
VARS( 4, 8)=  0.031573, VARS( 4, 9)=  0.261033, VARS( 4,10)= -0.264735
VARS( 5, 5)=  1.000001, VARS( 5, 6)=  0.558819, VARS( 5, 7)=  0.064374, VARS( 5, 8)=  0.012720,
VARS( 5, 9)=  0.352825, VARS( 5,10)= -0.460335
VARS( 6, 6)=  1.000001, VARS( 6, 7)=  0.101112, VARS( 6, 8)=  0.001713, VARS( 6, 9)=  0.089945,
VARS( 6,10)= -0.191875
VARS( 7, 7)=  1.000001, VARS( 7, 8)=  0.127050, VARS( 7, 9)= -0.155001, VARS( 7,10)=  0.103345
VARS( 8, 8)=  1.000001, VARS( 8, 9)=  0.054489, VARS( 8,10)= -0.030054
VARS( 9, 9)=  1.000001, VARS( 9,10)= -0.839266

         FOR ANOVA, TOTAL SUM OF SQUARES=            22502868.0546


STEP NUMBER  9             ENTER VARIABLE  7
STANDARD ERROR OF ESTIMATE=      69.33593
 VAR(  7) SSQ=                   2901.0004, RESIDUAL SSQ, BY ADDN OFVAR, SSQ=            3297924.5053593
MULTIPLE CORRELATION COEFFICIENT =   0.92332
GOODNESS OF FIT,F(   9, 686)=              443.8673
CONSTANT TERM=     472.681946
```

VAR	COEFF	STD DEV COEFF	T VALUE	BETA COEFF
1	89.201934	5.5420	16.0954	0.4141
2	-56.225235	5.2751	-10.6[illegible]	-0.30[illegible]7
3	69.578064	10.0647	6.9[illegible]	0.2254
4	71.539566	6.1586	11.6[illegible]	0.3671
5	-61.3[illegible]1269	4.9873	-12.3[illegible]	-0.3402
6	-26.633148	4.4071	-6.[illegible]	-0.1339
7	6.[illegible]	7.9115	0.7[illegible]7	0.017[illegible]
8	-5.575987	3.9921	-1.3967	-0.0210
9	-237.587158	11.5813	-20.5[illegible]	-0.4474

PLAQUE STUDY   STREGTH WITH INTERACTIONS   TABLE NO. 5C REGRESSION DATA

```
 CONTROL CARD USED FOR THIS REGRESSION
1337   033 2 0.000 0.000 0 0 51000 00 0 0000 00

 TRANSFORMATIONS SPECIFIED FOR THIS REGRESSION
91212 1 91010 2 7121210 7371210 1 813 0 1 910 0 610 5 7 611 5 8 612 5 9
613 1 5 614 1 6 615 1 7 616 1 8 617 1 9 618 2 3 619 6 7 620 2 5 621 6 8
622 6 9 623 2 8 624 2 9 625 7 8 626 3 5 627 3 6 628 7 9 629 3 8 630 3 9
631 4 5 632 8 9 633 4 7 634 4 8 635 4 9 636 5 5

 CONSTANT CARDS USED IN THIS REGRESSION
  1.125    0.100

CODING MAX., VARIABLES IN NUMERICAL ORDER

  1868.000     12.000     54.000    820.000     16.000    180.000    112.000     6.000     0.034   1792.000
    96.000      0.544  29840.003 335700.063 208880.031  11190.001     60.857   648.000 20160.003    192.000
  1080.000      5.915     72.000      0.393    672.000    864.000   9450.001     3.270   318.000      1.574
 13120.001      0.196  89600.015   4920.000     27.305   2880.000

CODING MIN., VARIABLES IN NUMERICAL ORDER
  1575.000      6.000     20.000    380.000      0.100     72.000     83.000     1.000     0.023      8.399
     0.100      0.002    161.000  10000.000  10000.000   1595.000     40.935   120.000  6375.000      0.600
    72.000      1.882      6.000      0.139     83.000      2.500   1800.000     2.133    20.000      0.603
    38.000      0.025  10000.000    380.000      8.816      7.199

AVERAGES
VAR( 1)=     0.2969, VAR( 2)=    -0.2241, VAR( 3)=     0.0955, VAR( 4)=    -0.0853,
VAR( 5)=    -0.0775, VAR( 6)=     0.0781, VAR( 7)=    -0.2812, VAR( 8)=     0.0000,
VAR( 9)=     0.0378, VAR(10)=    -0.2255, VAR(11)=    -0.4559, VAR(12)=    -0.1975,
VAR(13)=    -0.1438, VAR(14)=     0.3451, VAR(15)=     0.5612, VAR(16)=    -0.0446,
VAR(17)=    -0.0220, VAR(18)=    -0.1658, VAR(19)=    -0.1546, VAR(20)=    -0.3057,
VAR(21)=    -0.2382, VAR(22)=    -0.0595, VAR(23)=    -0.2985, VAR(24)=    -0.2067,
VAR(25)=    -0.1662, VAR(26)=    -0.2983, VAR(27)=    -0.1192, VAR(28)=    -0.0229,
VAR(29)=    -0.2247, VAR(30)=     0.0394, VAR(31)=    -0.1764, VAR(32)=    -0.1186,
VAR(33)=     0.1067, VAR(34)=    -0.2664, VAR(35)=    -0.1322, VAR(35)=    -0.1782,
VAR(37)=   504.2924

STANDARD DEVIATIONS
VAR( 1)=     0.8355, VAR( 2)=     0.9752, VAR( 3)=     0.5909, VAR( 4)=     0.9235,
VAR( 5)=     0.9976, VAR( 6)=     0.9135, VAR( 7)=     0.4987, VAR( 5)=     0.6802,
VAR( 9)=     0.3359, VAR(10)=     0.8409, VAR(11)=     0.6986, VAR(12)=     0.8689,
VAR(13)=     0.9294, VAR(14)=     0.5366, VAR(15)=     0.2050, VAR(16)=     0.6339,
VAR(17)=     0.2804, VAR(18)=     0.6916, VAR(19)=     0.7057, VAR(20)=     0.8228,
VAR(21)=     0.5945, VAR(22)=     0.7315, VAR(23)=     0.5516, VAR(24)=     0.6787,
VAR(25)=     0.5595, VAR(26)=     0.8025, VAR(27)=     0.6869, VAR(28)=     0.4308,
VAR(29)=     0.5220, VAR(30)=     0.5862, VAR(31)=     0.9252, VAR(32)=     0.5816,
VAR(33)=     0.4725, VAR(34)=     0.5661, VAR(35)=     0.6777, VAR(36)=     0.9283,
VAR(37)=   179.9395

SIMPLE CORRELATION COEFFICIENTS

         FOR ANOVA, TOTAL SUM OF SQUARES=            22502868.0546


STEP NUMBER 29            ENTER VARIABLE 19
STANDARD ERROR OF ESTIMATE=     58.31926
 VAR( 19) SSQ=                    0.5000, RESIDUAL SSQ, BY ADDN OFVAR. SSQ=          2265157.0058593
MULTIPLE CORRELATION COEFFICIENT =  0.94833
GOODNESS OF FIT,F(  29, 666)=          205.1817
CONSTANT TERM=    380.245728
```

VAR	COEFF	STD DEV COEFF	T VALUE	BETA COEFF
1	463.426758	107.9656	4.2923	2.1518
2	-155.736877	87.6298	-1.7772	-0.8440
3	114.552246	96.8055	1.1833	0.3761
4	-209.298797	125.3900	-1.6693	-1.0742
8	592.364991	158.9488	3.7267	2.2393
9	323.974915	161.3716	2.0076	0.6101
10	26.575225	202.2776	0.1313	0.1242
11	-36.196540	19.8868	-1.8201	-0.1405
12	-29.104309	83.1457	-0.3500	-0.1405
13	-358.222351	220.9790	-1.6210	-1.8503
15	-289.022273	408.2432	-0.7079	-0.3294
16	-240.209167	111.3417	-2.1574	-0.8463
17	-598.299439	174.7753	-3.4232	-0.9326
18	-102.236511	119.7064	-0.8540	-0.3929
19	-1.743304	95.0351	-0.0183	-0.0068
21	45.503929	24.8928	1.8279	0.1478
22	154.621673	95.9818	1.6109	0.6285
23	56.797714	38.3707	1.4802	0.1741
24	191.142029	102.1321	1.8715	0.7210
25	-208.001892	95.3578	-2.1812	-0.6468
26	366.768921	93.7426	3.9125	1.6359
27	-259.578491	109.0200	-2.3810	-0.9910
28	-37.319000	114.3418	-0.3263	-0.0893
29	13.137588	64.8701	0.2025	0.0381
31	-219.369965	96.7032	-2.2684	-1.1280
32	-272.247254	93.4037	-2.9147	-0.6800
33	493.866761	279.2557	1.7665	1.2973
34	-50.631485	40.6820	-1.2445	-0.1592
36	277.295410	73.2918	3.7834	1.4306

TABLE NO. 6A
Free Volume (Void) Data, Variable Designation

Number	Main Variables
Var 1	Temperature
Var 2	Belt. Speed
Var 3	Dew Point
Var 4	Atmosphere Amount
Var 5	Plaque Spacing
Var 6	1st Water Zone Temp.
Var 7	2nd Water Zone Temp.
Var 8	Plaque Sequence
Var 9	Thickness
Var 10	Response void w/o Interactions
Var 37	Response void with Interactions

INTERACTIONS

10 = 5 x 7	19 = 6 x 9	28 = 3 x 7
11 = 1 x 3	20 = 2 x 5	29 = 3 x 8
12 = 5 x 8	21 = 2 x 6	30 = 3 x 9
13 = 5 x 9	22 = 7 x 8	31 = 4 x 5
14 = 1 x 6	23 = 2 x 8	32 = 4 x 6
15 = 1 x 7	24 = 2 x 9	33 = 4 x 7
16 = 1 x 8	25 = 7 x 9	34 = 4 x 8
17 = 6 x 7	26 = 3 x 5	35 = 4 x 9
18 = 6 x 8	27 = 8 x 9	36 = 5 x 6

PLAQUE STUDY FREE VOLUME X 1000. W/O INTERACTIONS — TABLE NO. 6B REGRESSION DATA

```
PLAQUE STUDY  FREE VOLUME X 1000. W/O INTERACTIONS
  CONTROL CARD USED FOR THIS REGRESSION
1310    0 7 3 0.000 0.000 0 0 51000 00 0 0010 00
  TRANSFORMATIONS SPECIFIED FOR THIS REGRESSION
 9:010 1 9 9 9 2 2 9 9 0 53710 9 1 813 0 1 910 0 91037 3
  CONSTANT CARDS USED IN THIS REGRESSION
   0.100    0.0031000.000

 CODING MAX., VARIABLES IN NUMERICAL ORDER

   1868.000    12.000    54.000   820.000    16.000   180.000   112.000     6.000     0.034
 CODING MIN., VARIABLES IN NUMERICAL ORDER
   1575.000     6.000    20.000   380.000     0.100    72.000    83.000     1.000     0.023
AVERAGES
VAR( 1)=        0.2969, VAR( 2)=       -0.2241, VAR( 3)=        0.0955, VAR( 4)=       -0.0853,
VAR( 5)=       -0.0775, VAR( 6)=        0.0781, VAR( 7)=       -0.2812, VAR( 8)=        0.0000,
VAR( 9)=        0.0378, VAR(10)=       23.0076
STANDARD DEVIATIONS
VAR( 1)=        0.8355, VAR( 2)=        0.9752, VAR( 3)=        0.5909, VAR( 4)=        0.9235,
VAR( 5)=        0.9976, VAR( 6)=        0.9185, VAR( 7)=        0.4987, VAR( 8)=        0.6802,
VAR( 9)=        0.3388, VAR(10)=        1.8339
SIMPLE CORRELATION COEFFICIENTS
VARS( 1, 1)=  1.000001, VARS( 1, 2)=  0.261788, VARS( 1, 3)=  0.545688, VARS( 1, 4)= -0.293629,
VARS( 1, 5)= -0.262342, VARS( 1, 6)= -0.128441, VARS( 1, 7)=  0.407280, VARS( 1, 8)=  0.004603,
VARS( 1, 9)= -0.664428, VARS( 1,10)= -0.668596
VARS( 2, 2)=  1.000001, VARS( 2, 3)=  0.632436, VARS( 2, 4)=  0.189925, VARS( 2, 5)=  0.221655,
VARS( 2, 6)=  0.100863, VARS( 2, 7)=  0.577708, VARS( 2, 8)= -0.000000, VARS( 2, 9)=  0.044473,
VARS( 2,10)=  0.043512
VARS( 3, 3)=  1.000001, VARS( 3, 4)= -0.118545, VARS( 3, 5)=  0.221471, VARS( 3, 6)=  0.279250,
VARS( 3, 7)=  0.549487, VARS( 3, 8)=  0.018823, VARS( 3, 9)= -0.230425, VARS( 3,10)= -0.235842
VARS( 4, 4)=  1.000001, VARS( 4, 5)=  0.686236, VARS( 4, 6)=  0.525411, VARS( 4, 7)= -0.172018,
VARS( 4, 8)=  0.031573, VARS( 4, 9)=  0.261033, VARS( 4,10)=  0.262526
VARS( 5, 5)=  1.000001, VARS( 5, 6)=  0.558819, VARS( 5, 7)=  0.064374, VARS( 5, 8)=  0.012720,
VARS( 5, 9)=  0.382826, VARS( 5,10)=  0.383030
VARS( 6, 6)=  1.000001, VARS( 6, 7)=  0.101112, VARS( 6, 8)=  0.001713, VARS( 6, 9)=  0.089945,
VARS( 6,10)=  0.092333
VARS( 7, 7)=  1.000001, VARS( 7, 8)=  0.127050, VARS( 7, 9)= -0.155001, VARS( 7,10)= -0.147108
VARS( 8, 8)=  1.000001, VARS( 8, 9)=  0.054489, VARS( 8,10)=  0.053120
VARS( 9, 9)=  1.000001, VARS( 9,10)=  0.994846
         FOR ANOVA, TOTAL SUM OF SQUARES=                   2337.5185


STEP NUMBER  9            ENTER VARIABLE  2
STANDARD ERROR OF ESTIMATE=       0.18414
 VAR(  2) SSQ=                   0.0000, RESIDUAL SSQ, BY ADDN OFVAR, SSQ=                  23.2620201
MULTIPLE CORRELATION COEFFICIENT =  0.99501
GOODNESS OF FIT,F(   9, 686)=       7583.0722
CONSTANT TERM=      22.837989
```

VAR	COEFF	STD DEV COEFF	T VALUE	BETA COEFF
1	-0.031358	0.0147	-2.1304	-0.0142
2	-0.000007	0.0140	-0.0005	-0.0000
3	-0.038120	0.0267	-1.4261	-0.0122
4	0.000225	0.0163	0.0137	0.0001
5	0.005578	0.0132	0.4211	0.0030
6	0.003688	0.0117	0.3151	0.0018
7	0.066056	0.0210	3.1437	0.0179
8	-0.006828	0.0106	-0.6440	-0.0025
9	5.326005	0.0307	173.1565	0.9840

```
PLAQUE STUDY  FREE VOLUME WITH INTERACTIONS          TABLE NO. 6C  REGRESSION DATA
  CONTROL CARD USED FOR THIS REGRESSION
1337    033 2 0.000 0.000 0 0 51000 00 0 0000 00
  TRANSFORMATIONS SPECIFIED FOR THIS REGRESSION
 91010 1 9 9 9 2 2 9 9 0 53710 9 1 813 0 1 910 0 610 5 7 611 1 3 612 5 8
 613 5 9 614 1 6 615 1 7 616 1 8 617 6 7 618 6 8 619 6 9 620 2 5 621 2 6
 622 7 8 623 2 8 624 2 9 625 7 9 626 3 5 627 8 9 628 3 7 629 3 8 630 3 9
 631 4 5 632 4 6 633 4 7 634 4 8 635 4 9 636 5 6
  CONSTANT CARDS USED IN THIS REGRESSION
  0.100    0.003
 CODING MAX., VARIABLES IN NUMERICAL ORDER

   1868.000      12.000      54.000     820.000      16.000     180.000     112.000       6.000     0.034   1792.000
 100440.015      96.000       0.544  335700.063  208880.031   11190.001   20160.003    1080.000     5.915    192.000
   2160.000     672.000      72.000       0.393       3.270     864.000       0.196    5600.000   318.000      1.574
  13120.001  145140.031   89600.015    4920.000      27.305    2880.000
 CODING MIN., VARIABLES IN NUMERICAL ORDER
   1575.000       6.000      20.000     380.000       0.100      72.000      83.000       1.000     0.023      8.399
  10000.000       0.100       0.002   10000.000   10000.000    1595.000    6375.000      72.000     1.882      0.600
    432.000      83.000       6.000       0.139       2.133       2.500       0.025    1660.000    20.000      0.603
     38.000   10000.000   10000.000     380.000       8.816       7.199

AVERAGES
VAR( 1)=       0.2969, VAR( 2)=      -0.2241, VAR( 3)=       0.0955, VAR( 4)=      -0.0853,
VAR( 5)=      -0.0775, VAR( 6)=       0.0781, VAR( 7)=      -0.2812, VAR( 8)=       0.0000,
VAR( 9)=       0.0378, VAR(10)=      -0.2265, VAR(11)=       0.3012, VAR(12)=      -0.4559,
VAR(13)=      -0.1975, VAR(14)=       0.3451, VAR(15)=       0.5612, VAR(16)=      -0.0446,
VAR(17)=      -0.1546, VAR(18)=      -0.2382, VAR(19)=      -0.0695, VAR(20)=      -0.3057,
VAR(21)=      -0.2279, VAR(22)=      -0.1662, VAR(23)=      -0.2985, VAR(24)=      -0.2067,
VAR(25)=      -0.0229, VAR(26)=      -0.2983, VAR(27)=      -0.1166, VAR(28)=       0.0092,
VAR(29)=      -0.2247, VAR(30)=       0.0394, VAR(31)=      -0.1764, VAR(32)=       0.0503,
VAR(33)=       0.1067, VAR(34)=      -0.2664, VAR(35)=      -0.1322, VAR(36)=      -0.1782,
VAR(37)=       0.0230
STANDARD DEVIATIONS
VAR( 1)=       0.8355, VAR( 2)=       0.9752, VAR( 3)=       0.5909, VAR( 4)=       0.9235,
VAR( 5)=       0.9976, VAR( 6)=       0.9185, VAR( 7)=       0.4987, VAR( 8)=       0.6802,
VAR( 9)=       0.3388, VAR(10)=       0.8409, VAR(11)=       0.4516, VAR(12)=       0.6985,
VAR(13)=       0.8689, VAR(14)=       0.5365, VAR(15)=       0.2050, VAR(16)=       0.6339,
VAR(17)=       0.7057, VAR(18)=       0.5845, VAR(19)=       0.7315, VAR(20)=       0.8228,
VAR(21)=       0.7054, VAR(22)=       0.5595, VAR(23)=       0.5515, VAR(24)=       0.6787,
VAR(25)=       0.4308, VAR(26)=       0.6025, VAR(27)=       0.5516, VAR(28)=       0.5541,
VAR(29)=       0.5220, VAR(30)=       0.5862, VAR(31)=       0.9252, VAR(32)=       0.7273,
VAR(33)=       0.4726, VAR(34)=       0.5661, VAR(35)=       0.6777, VAR(36)=       0.9283,
VAR(37)=       0.0018
SIMPLE CORRELATION COEFFICIENTS

        FOR ANOVA, TOTAL SUM OF SQUARES=                  0.0023


STEP NUMBER 26          ENTER VARIABLE 19
STANDARD ERROR OF ESTIMATE=      0.00013
 VAR( 19) SSQ=                    0.0000, RESIDUAL SSQ, BY ADDN OFVAR, SSQ=                        0.0000130
MULTIPLE CORRELATION COEFFICIENT =  0.99720
GOODNESS OF FIT,F(   26, 669)=       4582.5000
CONSTANT TERM=         0.007854
```

VAR	COEFF	STD DEV COEFF	T VALUE	BETA COEFF
1	-0.003929	0.0002	-18.9672	-1.7901
2	0.000213	0.0001	2.0649	0.1135
7	-0.005396	0.0004	-12.7855	-1.4677
9	0.004632	0.0003	14.0896	0.8559
10	0.000525	0.0001	3.3231	0.2410
11	0.003967	0.0004	8.0883	0.9770
12	-0.000081	0.0000	-1.8885	-0.0311
13	0.000500	0.0001	2.7576	0.2373
15	0.024508	0.0011	20.6927	2.7408
16	-0.001314	0.0002	-6.4659	-0.4544
18	-0.000224	0.0000	-3.8990	-0.0714
19	0.000235	0.0002	1.1369	0.0938
20	-0.000584	0.0003	-1.5671	-0.2623
21	0.000376	0.0004	0.8685	0.1447
22	0.001031	0.0002	4.8463	0.3146
23	-0.000325	0.0000	-4.0015	-0.0979
25	0.000138	0.0004	0.3216	0.0325
26	0.000379	0.0001	2.4157	0.1663
27	0.000165	0.0001	1.2708	0.0526
28	-0.004271	0.0005	-8.4595	-1.2904
29	0.000622	0.0001	4.1777	0.1771
30	0.000479	0.0002	1.9487	0.1532
31	-0.000469	0.0001	-3.7192	-0.2367
34	0.000354	0.0000	3.9444	0.1092
35	0.000532	0.0000	6.7480	0.1967
36	-0.000953	0.0001	-7.0307	-0.4829

TABLE NO. 7A
Thickness Data Variable Designation

Number	Main Variables
Var 1	Temperature
Var 2	Belt. Speed
Var 3	Dew Point
Var 4	Atmosphere Amount
Var 5	Plaque Spacing
Var 6	1st Water Zone Temp.
Var 7	2nd Water Zone Temp.
Var 8	Plaque Sequence
Var 9	Weight for 2 sq. in.
Var 10	Response, thickness x 10 w/o Interactions
Var 37	Response, thickness x 10 with Interactions

INTERACTIONS

10 = 1 x 2	21 = 7 x 8	32 = 4 x 5
11 = 5 x 7	22 = 3 x 7	33 = 4 x 7
12 = 5 x 8	23 = 2 x 8	34 = 4 x 8
13 = 5 x 9	24 = 2 x 9	35 = 4 x 9
14 = 6 x 7	25 = 7 x 9	36 = 5 x 6
15 = 6 x 8	26 = 3 x 5	
16 = 1 x 8	27 = 3 x 6	
17 = 6 x 9	28 = 8 x 9	
18 = 2 x 3	29 = 3 x 8	
19 = 2 x 4	30 = 3 x 9	
20 = 2 x 5	31 = 4 x 5	

PLAQUE STUDY-THICKNESS X 10. RESPONSE W/O INTERACTIONS TABLE NO. 7B

```
 CONTROL CARD USED FOR THIS REGRESSIO.
1310   0 1 0 0.000 0.000 0 0 51000 00 0 0010 90

 TRANSFORMATIONS SPECIFIED FOR THIS REGRESSION
1 813 0

CODING MAX.. VARIABLES IN NUMERICAL ORDER

  1868.000    12.000    54.000   820.000    16.000   180.000   112.000     6.000     1.923

CODING MIN.. VARIABLES IN NUMERICAL ORDER
  1575.000     6.000    20.000   380.000     0.100    72.000    83.000     1.000     1.594

AVERAGES
VAR( 1)=      0.2969, VAR( 2)=     -0.2241, VAR( 3)=      0.0955, VAR( 4)=     -0.0853,
VAR( 5)=     -0.0775, VAR( 6)=      0.0781, VAR( 7)=     -0.2812, VAR( 8)=      0.0000,
VAR( 9)=     -0.4179, VAR(10)=      0.2880

STANDARD DEVIATIONS
VAR( 1)=      0.8355, VAR( 2)=      0.9752, VAR( 3)=      0.5909, VAR( 4)=      0.9235,
VAR( 5)=      0.9976, VAR( 6)=      0.9185, VAR( 7)=      0.4987, VAR( 8)=      0.6802,
VAR( 9)=      0.2597, VAR(10)=      0.0183

SIMPLE CORRELATION COEFFICIENTS
VARS( 1, 1)=  1.000001, VARS( 1, 2)=  0.261738, VARS( 1, 3)=  0.545688, VARS( 1, 4)= -0.293629,
VARS( 1, 5)= -0.262342, VARS( 1, 6)= -0.128-41, VARS( 1, 7)=  0.407880, VARS( 1, 8)=  0.004603,
VARS( 1, 9)=  0.072492, VARS( 1,10)= -0.661249
VARS( 2, 2)=  1.000001, VARS( 2, 3)=  0.032436, VARS( 2, 4)=  0.189925, VARS( 2, 5)=  0.221655,
VARS( 2, 6)=  0.100863, VARS( 2, 7)=  0.577708, VARS( 2, 8)= -0.000000, VARS( 2, 9)=  0.010751,
VARS( 2,10)=  0.044260
VARS( 3, 3)=  1.000001, VARS( 3, 4)= -0.118545, VARS( 3, 5)=  0.221471, VARS( 3, 6)=  0.279250,
VARS( 3, 7)=  0.549487, VARS( 3, 8)=  0.018323, VARS( 3, 9)=  0.074882, VARS( 3,10)= -0.229321
VARS( 4, 4)=  1.000001, VARS( 4, 5)=  0.686235, VARS( 4, 6)=  0.525411, VARS( 4, 7)= -0.172018,
VARS( 4, 8)=  0.031573, VARS( 4, 9)= -0.02627., VARS( 4,10)=  0.259821
VARS( 5, 5)=  1.000001, VARS( 5, 6)=  0.558819, VARS( 5, 7)=  0.064374, VARS( 5, 8)=  0.012720,
VARS( 5, 9)= -0.013674, VARS( 5,10)=  0.381059
VARS( 6, 6)=  1.000001, VARS( 6, 7)=  0.101112, VARS( 6, 8)=  0.001713, VARS( 6, 9)= -0.032052,
VARS( 6,10)=  0.089581
VARS( 7, 7)=  1.000001, VARS( 7, 8)=  0.127050, VARS( 7, 9)= -0.097314, VARS( 7,10)= -0.154625
VARS( 8, 8)=  1.000001, VARS( 8, 9)=  0.015599, VARS( 8,10)=  0.054243
VARS( 9, 9)=  1.000000, VARS( 9,10)=  0.036112

        FOR ANOVA, TOTAL SUM OF SQUARES=                       0.2348

STEP NUMBER  9              ENTER VARIABLE  7
STANDARD ERROR OF ESTIMATE=     0.01233
 VAR(  7) SS2=                  0.0003, RESIDUAL SS , BY ADD. .FV. . SS =                    0.1052184
MULTIPLE CORRELATION COEFFICIENT =  0.74290
GOODNESS OF FIT,F(   9, 686)=        93.8829
CONSTANT TERM=        0.295867
```

VAR	COEFF	STD DEV COEFF	T VALUE	BET COEFF
1	-0.013362	0.0008	-15.6927	-0.6074
2	0.005831	0.0009	6.3727	0.3094
3	-0.005431	0.0017	-3.0347	-0.1746
4	-0.005047	0.0010	-4.6613	-0.2535
5	0.007350	0.0008	8.7011	0.3969
6	-0.001052	0.0007	-1.3348	-0.0526
7	-0.007011	0.0014	-1.4078	-0.0545
8	0.001865	0.0007	2.6276	0.0590
9	0.005703	0.0018	3.0873	0.0806

PLAQUE STUDY - THICKNESS

TABLE NO. 7C REGRESSION DATA

"TO THICKNESS x 10 WITH INTERACTIONS"

```
CONTROL CARD USED FOR THIS REGRESSION
1337  029 0 0.000 0.000 0 0 51.00 00 0 0000 00

TRANSFORMATIONS SPECIFIED FOR THIS REGRESSION
1310 3 1 813 0 610 1 2 611 5 7 612 5 8 613 5 9 614 6 7 615 6 8 616 1 8
617 5 9 618 2 3 619 2 4 620 2 5 621 7 8 622 3 7 623 2 8 624 2 9 625 7 9
626 3 5 627 3 6 628 8 9 629 3 8 630 3 9 631 4 5 632 4 6 633 4 7 634 4 8
635 4 9 636 5 6

CODING MAX., VARIABLES IN NUMERICAL ORDER

   1868.000      12.000      54.000     820.000      15.000     180.000     112.000       6.000       1.925   22410.000
   1792.000      96.000      29.998   20160.000    1080.000   11193.001     334.001     548.000    9840.001     192.000
    672.000    5600.000      72.000      22.415     195.215     864.000    9450.001      10.812     318.000      91.000
  13120.001  145140.031   89600.015    4920.000    1907.159    2880.000

CODING MIN., VARIABLES IN NUMERICAL ORDER
   1575.000       6.000      20.000     380.000       0.100      72.000      85.000       1.000       1.594    9600.001
      8.399       0.100       0.159    6375.000      72.000    1595.000     115.423     120.000    2280.000       0.000
     83.000    1660.000       6.000       9.565     135.236       2.500    1300.000       1.595      20.000      32.900
     38.000   10000.000   10000.000     380.000     505.099       7.199

AVERAGES
VAR( 1)=      0.2969, VAR( 2)=     -0.2241, VAR( 3)=      0.0955, VAR( 4)=     -0.0853,
VAR( 5)=     -0.3775, VAR( 6)=      0.0791, VAR( 7)=     -0.2812, VAR( 8)=      0.0000,
VAR( 9)=     -0.4179, VAR(10)=     -0.1597, VAR(11)=     -0.2265, VAR(12)=     -0.4559,
VAR(13)=     -0.1660, VAR(14)=     -0.1546, VAR(15)=     -0.2532, VAR(16)=     -0.0446,
VAR(17)=     -0.0507, VAR(18)=     -0.1658, VAR(19)=     -0.2928, VAR(20)=     -0.3057,
VAR(21)=     -0.1362, VAR(22)=      0.0092, VAR(23)=     -0.2955, VAR(24)=     -0.2989,
VAR(25)=     -0.2698, VAR(26)=     -0.2983, VAR(27)=     -0.1192, VAR(28)=     -0.0625,
VAR(29)=     -0.2247, VAR(30)=     -0.0197, VAR(31)=     -0.1764, VAR(32)=      0.0503,
VAR(33)=      0.1057, VAR(34)=     -0.2634, VAR(35)=     -0.1658, VAR(36)=     -0.1782,
VAR(37)=      0.2350

STANDARD DEVIATIONS
VAR( 1)=      0.9355, VAR( 2)=      0.9752, VAR( 3)=      0.5909, VAR( 4)=      0.9235,
VAR( 5)=      0.9976, VAR( 6)=      0.9155, VAR( 7)=      0.4937, VAR( 8)=      0.6802,
VAR( 9)=      0.2577, VAR(10)=      0.9886, VAR(11)=      0.8409, VAR(12)=      0.6956,
VAR(13)=      0.9015, VAR(14)=      0.7057, VAR(15)=      0.5845, VAR(16)=      0.6339,
VAR(17)=      0.7689, VAR(18)=      0.6716, VAR(19)=      0.7208, VAR(20)=      0.8228,
VAR(21)=      0.5595, VAR(22)=      0.5541, VAR(23)=      0.5516, VAR(24)=      0.7747,
VAR(25)=      0.4214, VAR(26)=      0.8025, VAR(27)=      0.6969, VAR(28)=      0.6254,
VAR(29)=      0.5220, VAR(30)=      0.5206, VAR(31)=      0.9252, VAR(32)=      0.7273,
VAR(33)=      0.4726, VAR(34)=      0.5561, VAR(35)=      0.7624, VAR(36)=      0.9283,
VAR(37)=      0.0153

SIMPLE CORRELATION COEFFICIENTS

        FOR ANOVA, TOTAL SUM OF SQUARES=                      0.2348


STEP NUMBER 23              ENTER VARIABLE 29
STANDARD ERROR OF ESTIMATE=      0.01179
 VAR( 29) SSQ=                   0.0000, RESIDUAL SSQ, BY ADDN OFVAR. SSQ=                 0.0934409
MULTIPLE CORRELATION COEFFICIENT =  0.77593
GOODNESS OF FIT,F(  23, 672)=         44.2055
CONSTANT TERM=         0.307844
```

VAR	COEFF	STD DEV COEFF	T VALUE	BETA COEFF
1	-0.019732	0.0023	-8.2764	-0.8995
4	0.015103	0.0165	0.9135	0.7558
5	0.063421	0.0134	4.7032	3.4412
7	-0.007175	0.0069	-1.0475	-0.1947
9	0.037189	0.0055	5.4832	0.4549
12	-0.002731	0.0035	-0.7595	-0.1053
15	0.004078	0.0049	0.8466	0.1293
16	0.033134	0.0187	1.7652	1.1435
18	0.073210	0.0179	4.0700	2.7545
20	-0.028135	0.0123	-2.2822	-1.2603
21	0.012205	0.0162	0.7541	0.3727
23	-0.005449	0.0057	-0.9532	-0.1947
24	-0.017411	0.0114	-1.5254	-0.7307
26	-0.050135	0.0195	-2.5727	-2.4317
27	0.033321	0.0262	3.4467	3.3737
28	-0.029024	0.0163	-1.7752	-0.7432
29	-0.009557	0.0117	-0.7973	-0.2714
30	-0.053775	0.0122	-4.4134	-2.0521
31	0.077240	0.0305	2.5304	3.5941
32	-0.138692	0.0474	-2.9029	-3.4717
33	0.039950	0.0239	1.6592	1.2173
34	-0.007344	0.0075	-0.9750	-0.2231
36	-0.043519	0.0114	-3.7909	-2.1310

NOT REPRODUCIBLE

Table No. 8A - Variable Designations For
Table No. 8B-E - Strength and Void

For Void Predictions:

Use Table No. 6A With Interactions

For Strength Predictions:

Use Table No. 5A With Interactions

<u>Table No. 8B</u>: Original Factorial Data
Column 1-9 = (L to R) = Var. I to 9.
Column 10 = Predicted Thickness x 10

<u>Using Regression Table 7A</u>:

Column 11 = Predicted Void x 10

<u>Using Regression Table 6A</u>

Column 12 = Predicted Strength

<u>Using Regression Table 5A</u>

Column 13 = Void x Strength

<u>Table No. 8C</u>: Predicted Actual Void and Strength (L to R) Without Changing Levels (As check)

<u>Table No. 8D</u>: Same Except Plaque Sequence (Var. 8) All At 6 Level

<u>Table No. 8E</u>: Same Except Plaque Sequence (Var. 8) All At 6 and Belt Speed (Var. 2) All at 12 Levels

<u>Table No. 8F:</u> Same Except Plaque Sequence (Var. 8) All At 6, Belt Speed (Var. 2) All at 12 and Plaque Spacing (Var. 5) All at 1 (Closest) Levels.

TABLE NO. 8 B

OBS(1)=	1868.	6.	20.	820.	0.1	72.	112.	1.	0.034	0.3131	0.2936	546.20	160.4
OBS(2)=	1868.	12.	20.	820.	0.1	72.	112.	1.	0.034	0.3137	0.2991	505.60	151.2
OBS(3)=	1575.	6.	54.	380.	16.0	180.	83.	1.	0.034	0.3023	0.2833	558.50	158.2
OBS(4)=	1868.	12.	54.	380.	16.0	180.	83.	1.	0.034	0.2939	0.2802	569.80	160.
OBS(5)=	1575.	6.	54.	380.	16.0	180.	83.	6.	0.034	0.2868	0.2854	568.40	162.2
OBS(6)=	1868.	12.	54.	380.	16.0	180.	83.	6.	0.034	0.2826	0.2754	558.00	153.7
OBS(7)=	1868.	12.	20.	380.	0.1	180.	83.	6.	0.034	0.2741	0.2722	608.10	165.5
OBS(8)=	1868.	12.	20.	380.	0.1	180.	83.	1.	0.034	0.2700	0.2828	574.90	162.6
OBS(9)=	1868.	6.	20.	380.	0.1	180.	83.	1.	0.034	0.2693	0.2744	615.50	168.9
OBS(10)=	1868.	6.	54.	380.	16.0	180.	83.	1.	0.034	0.2648	0.2777	689.40	191.4
OBS(11)=	1868.	6.	54.	380.	16.0	180.	112.	1.	0.034	0.2626	0.2755	596.00	164.2
OBS(12)=	1868.	6.	54.	820.	16.0	180.	112.	1.	0.034	0.2610	0.2797	542.90	151.8
OBS(13)=	1868.	6.	54.	380.	16.0	180.	83.	6.	0.034	0.2594	0.2759	626.00	172.7

TABLE NO. 8 C

OBS(1)=	0.029359	546.186158
OBS(2)=	0.029910	505.599793
OBS(3)=	0.028327	558.494264
OBS(4)=	0.028021	569.779176
OBS(5)=	0.028544	568.432374
OBS(6)=	0.027541	557.999757
OBS(7)=	0.027221	608.128419
OBS(8)=	0.028276	574.883912
OBS(9)=	0.027443	615.470094
OBS(10)=	0.027770	689.365724
OBS(11)=	0.027548	595.956178
OBS(12)=	0.027973	542.941773
OBS(13)=	0.027586	625.952272

TABLE NO. 8 D

OBS(1)=	0.029689	327.560242
OBS(2)=	0.029945	338.608338
OBS(3)=	0.028544	568.432374
OBS(4)=	0.027541	557.999757
OBS(5)=	0.028544	568.432374
OBS(6)=	0.027541	557.999757
OBS(7)=	0.027221	608.128419
OBS(8)=	0.027221	608.128419
OBS(9)=	0.026683	597.079835
OBS(10)=	0.027586	625.952272
OBS(11)=	0.027872	430.131165
OBS(12)=	0.028639	328.046509
OBS(13)=	0.027586	625.952272

TABLE NO. 8E

OBS(1)=	0.029945	338.608338
OBS(2)=	0.029945	338.608338
OBS(3)=	0.028499	500.479553
OBS(4)=	0.027541	557.999757
OBS(5)=	0.028499	500.479553
OBS(6)=	0.027541	557.999757
OBS(7)=	0.027221	608.128419
OBS(8)=	0.027221	608.128419
OBS(9)=	0.027221	608.128419
OBS(10)=	0.027541	557.999757
OBS(11)=	0.027827	362.178894
OBS(12)=	0.028595	260.093506
OBS(13)=	0.027541	557.999757

TABLE NO. 8 F

OBS(1)=	0.029945	338.608338
OBS(2)=	0.029945	338.608338
OBS(3)=	0.029627	114.807144
OBS(4)=	0.028669	284.787293
OBS(5)=	0.029627	114.807144
OBS(6)=	0.028669	284.787293
OBS(7)=	0.027221	608.128419
OBS(8)=	0.027221	608.128419
OBS(9)=	0.027221	608.128419
OBS(10)=	0.028669	284.787293
OBS(11)=	0.028684	75.225906
OBS(12)=	0.029953	207.770111
OBS(13)=	0.028669	284.787293

TABLE NO. 9 A

Full factorial data for high void and strenght level selection

1	1575.000	12.000	54.800	380.000	16.000	180.000	83.000	1.000	0.034	0.285	439.900
2	1868.000	6.000	20.000	380.000	16.000	180.000	83.000	6.000	0.034	0.256	410.000
3	1868.000	6.000	20.000	380.000	16.000	180.000	83.000	1.000	0.034	0.265	468.400
4	1575.000	12.000	20.000	380.000	16.000	180.000	83.000	6.000	0.034	0.274	363.500
5	1868.000	6.000	20.000	380.000	16.000	180.000	112.000	1.000	0.034	0.284	395.000
6	1868.000	12.000	20.000	820.000	0.100	72.000	112.000	6.000	0.034	0.299	338.300
7	1868.000	6.000	20.000	820.000	16.000	180.000	112.000	1.000	0.034	0.289	342.000
8	1575.000	12.000	54.000	380.000	16.000	180.000	83.000	6.000	0.034	0.285	500.500
9	1868.000	6.000	20.000	380.000	0.100	72.000	83.000	6.000	0.034	0.262	433.000
10	1575.000	12.000	20.000	380.000	0.100	180.000	83.000	1.000	0.034	0.297	331.000
11	1575.000	6.000	20.000	380.000	0.100	180.000	83.000	1.000	0.034	0.288	372.100
12	1575.000	6.000	20.000	380.000	0.100	180.000	83.000	6.000	0.034	0.285	427.100
13	1868.000	12.000	20.000	820.000	0.100	72.000	83.000	1.000	0.034	0.282	453.300
14	1868.000	6.000	20.000	820.000	0.100	72.000	83.000	1.000	0.034	0.277	494.200
15	1868.000	12.000	20.000	380.000	0.100	72.000	83.000	1.000	0.034	0.273	430.300
16	1868.000	12.000	20.000	380.000	0.100	72.000	83.000	6.000	0.034	0.265	414.800
17	1868.000	6.000	20.000	380.000	0.100	72.000	83.000	1.000	0.034	0.267	470.900
18	1575.000	12.000	20.000	380.000	0.100	180.000	83.000	6.000	0.034	0.290	438.100
19	1868.000	6.000	20.000	820.000	0.100	72.000	83.000	6.000	0.034	0.275	378.000
20	1575.000	6.000	54.000	380.000	16.000	180.000	112.000	1.000	0.034	0.260	489.800
21	1868.000	6.000	20.000	380.000	0.100	72.000	112.000	1.000	0.034	0.284	364.000
22	1575.000	6.000	54.000	820.000	16.000	180.000	112.000	1.000	0.034	0.264	450.800
23	1868.000	12.000	54.000	820.000	0.100	72.000	112.000	1.000	0.034	0.285	416.300
24	1868.000	12.000	20.000	820.000	0.100	72.000	83.000	6.000	0.034	0.277	309.000
25	1868.000	12.000	54.000	380.000	16.000	180.000	112.000	1.000	0.034	0.278	476.400
26	1575.000	6.000	54.000	380.000	16.000	180.000	112.000	6.000	0.034	0.267	397.300
27	1868.000	12.000	54.000	820.000	16.000	180.000	112.000	1.000	0.034	0.282	423.400
28	1575.000	6.000	54.000	820.000	16.000	180.000	83.000	1.000	0.034	0.237	347.100
29	1868.000	12.000	20.000	380.000	16.000	180.000	83.000	1.000	0.034	0.268	447.800
30	1868.000	12.000	20.000	380.000	16.000	180.000	83.000	6.000	0.034	0.256	421.000
31	1868.000	12.000	54.000	380.000	16.000	180.000	112.000	6.000	0.034	0.278	302.200
32	1868.000	12.000	54.000	820.000	0.100	72.000	83.000	1.000	0.034	0.290	304.300
33	1868.000	12.000	20.000	380.000	16.000	180.000	112.000	1.000	0.034	0.287	334.400
34	1868.000	6.000	20.000	380.000	0.100	180.000	112.000	6.000	0.034	0.266	307.300
35	1868.000	6.000	54.000	380.000	0.100	180.000	83.000	1.000	0.034	0.281	336.100
36	1868.000	6.000	54.000	380.000	0.100	180.000	83.000	6.000	0.034	0.281	332.700
37	1868.000	12.000	54.000	820.000	16.000	180.000	83.000	1.000	0.034	0.284	338.400
38	1868.000	6.000	20.000	380.000	0.100	180.000	83.000	6.000	0.034	0.265	597.100
39	1868.000	12.000	20.000	380.000	0.100	180.000	112.000	6.000	0.034	0.293	378.000
40	1868.000	12.000	20.000	380.000	0.100	180.000	112.000	1.000	0.034	0.299	467.700
41	1868.000	6.000	20.000	380.000	0.100	180.000	112.000	1.000	0.034	0.290	506.300
42	1868.000	6.000	54.000	380.000	16.000	180.000	112.000	6.000	0.034	0.278	430.100
43	1868.000	6.000	54.000	380.000	16.000	72.000	83.000	1.000	0.034	0.282	452.300
44	1868.000	6.000	54.000	380.000	16.000	72.000	112.000	1.000	0.034	0.280	309.000
45	1868.000	6.000	54.000	820.000	16.000	180.000	83.000	1.000	0.034	0.281	476.300
46	1868.000	6.000	54.000	820.000	0.100	72.000	112.000	1.000	0.034	0.279	336.100
47	1868.000	6.000	54.000	820.000	16.000	180.000	83.000	6.000	0.034	0.283	303.300
48	1868.000	6.000	20.000	820.000	0.100	72.000	112.000	1.000	0.034	0.293	346.200
49	1868.000	12.000	20.000	820.000	0.100	72.000	112.000	1.000	0.034	0.279	305.000
50	1575.000	6.000	54.000	380.000	16.000	180.000	83.000	1.000	0.034	0.283	338.300
51	1868.000	12.000	54.000	380.000	16.000	180.000	83.000	1.000	0.034	0.280	307.300
52	1575.000	6.000	54.000	380.000	16.000	180.000	83.000	6.000	0.034	0.285	368.400
53	1868.000	12.000	54.000	380.000	16.000	180.000	83.000	6.000	0.034	0.275	338.000
54	1868.000	12.000	20.000	380.000	0.100	180.000	83.000	6.000	0.034	0.272	600.100
55	1868.000	12.000	20.000	380.000	0.100	180.000	83.000	1.000	0.034	0.282	374.900
56	1868.000	6.000	20.000	380.000	0.100	180.000	83.000	1.000	0.034	0.274	615.300
57	1868.000	6.000	54.000	380.000	16.000	180.000	83.000	1.000	0.034	0.277	689.400
58	1868.000	6.000	54.000	380.000	16.000	180.000	112.000	1.000	0.034	0.275	390.000
59	1868.000	6.000	54.000	820.000	16.000	180.000	112.000	1.000	0.034	0.279	542.700
60	1868.000	6.000	54.000	380.000	16.000	180.000	83.000	6.000	0.034	0.275	626.000

TABLE NO. 9 B

Regression of Table 9A Data For Void X 10

```
CODING MAX., VARIABLES IN NUMERICAL ORDER

 1868.000     12.000     54.000    820.000     16.000    180.000    112.000      6.000      0.034
CODING MIN., VARIABLES IN NUMERICAL ORDER
 1575.000      6.000     20.000    380.000      0.100     72.000     83.000      1.000      0.034
AVERAGES
VAR( 1)=       0.5666, VAR( 2)=    -0.1333, VAR( 3)=    -0.0666, VAR( 4)=    -0.4000,
VAR( 5)=       0.0333, VAR( 6)=     0.4333, VAR( 7)=    -0.2333, VAR( 8)=    -0.2333,
VAR( 9)=       0.0000, VAR(10)=     0.2800
STANDARD DEVIATIONS
VAR( 1)=       0.8308, VAR( 2)=     0.9994, VAR( 3)=     1.0061, VAR( 4)=     0.9242,
VAR( 5)=       1.0078, VAR( 6)=     0.9088, VAR( 7)=     0.9806, VAR( 8)=     0.9806,
VAR( 9)=       0.0000, VAR(10)=     0.0101
SIMPLE CORRELATION COEFFICIENTS
VARS( 1, 1)=  1.000000, VARS( 1, 2)=  0.051705, VARS( 1, 3)= -0.156777, VARS( 1, 4)=  0.167734,
VARS( 1, 5)= -0.184850, VARS( 1, 6)= -0.330682, VARS( 1, 7)=  0.165029, VARS( 1, 8)= -0.084595,
VARS( 1, 9)=  0.000000, VARS( 1,10)= -0.058179
VARS( 2, 2)=  1.000000, VARS( 2, 3)= -0.143823, VARS( 2, 4)=  0.014678, VARS( 2, 5)= -0.096470,
VARS( 2, 6)= -0.047271, VARS( 2, 7)= -0.066870, VARS( 2, 8)=  0.071482, VARS( 2, 9)=  0.000000,
VARS( 2,10)=  0.211075
VARS( 3, 3)=  1.000000, VARS( 3, 4)=  0.116642, VARS( 3, 5)=  0.570475, VARS( 3, 6)=  0.217470,
VARS( 3, 7)=  0.087034, VARS( 3, 8)= -0.119100, VARS( 3, 9)=  0.000000, VARS( 3,10)= -0.032019
VARS( 4, 4)=  1.000000, VARS( 4, 5)= -0.094613, VARS( 4, 6)= -0.395482, VARS( 4, 7)=  0.157088,
VARS( 4, 8)= -0.216932, VARS( 4, 9)=  0.000000, VARS( 4,10)=  0.261069
VARS( 5, 5)=  1.000000, VARS( 5, 6)=  0.502060, VARS( 5, 7)=  0.076600, VARS( 5, 8)= -0.060594,
VARS( 5, 9)=  0.000000, VARS( 5,10)= -0.283606
VARS( 6, 6)=  1.000000, VARS( 6, 7)= -0.036769, VARS( 6, 8)=  0.115376, VARS( 6, 9)=  0.000000,
VARS( 6,10)= -0.058371
VARS( 7, 7)=  1.000000, VARS( 7, 8)= -0.198590, VARS( 7, 9)=  0.000000, VARS( 7,10)=  0.266429
VARS( 8, 8)=  1.000000, VARS( 8, 9)=  0.000000, VARS( 8,10)= -0.221422
VARS( 9, 9)=  0.000000, VARS( 9,10)=  0.000000
          FOR ANOVA, TOTAL SUM OF SQUARES=                         0.0060

STEP NUMBER  8             ENTER VARIABLE  3
STANDARD ERROR OF ESTIMATE=      0.00875
 VAR(  3) SSQ=                   0.0000, RESIDUAL SSQ, BY ADDN OFVAR. SSQ=                0.0039130
MULTIPLE CORRELATION COEFFICIENT =  0.59728
GOODNESS OF FIT,F(   8,   51)=           3.5356
CONSTANT TERM=          0.281732
```

VAR	COEFF	STD DEV COEFF	T VALUE	BETA COEFF
1	-0.001954	0.0014	-1.3154	-0.1599
2	0.002339	0.0011	2.0188	0.2301
3	0.001363	0.0014	0.9534	0.1351
4	0.002588	0.0014	1.8380	0.2355
5	-0.005057	0.0015	-3.2239	-0.5020
6	0.002762	0.0016	1.6835	0.2472
7	0.002788	0.0012	2.2932	0.2693
8	-0.001963	0.0012	-1.6091	-0.1896

TABLE 9 D

Predictions Using Tables 5 and 6 Regressions. Variables Same As Table No. 9 A

OBS(1)=	1868.	6.	54.	380.	.1	180.	83.	1.	.034
OBS(2)=	1868.	6.	54.	380.	.1	180.	83.	6.	.034
OBS(3)=	1868.	12.	54.	380.	.1	180.	83.	6.	.034
OBS(4)=	1575.	12.	54.	820.	.1	180.	112.	1.	.034
OBS(5)=	1575.	12.	54.	820.	.1	180.	112.	6.	.034

	VOID	STRENGTH
OBS(1)=	0.028182	356.140686
OBS(2)=	0.028131	352.739441
OBS(3)=	0.028569	284.787293
OBS(4)=	0.027910	92.383011
OBS(5)=	0.028817	62.486457

OBS (1) = High strength levels, 5 already at desired level.
OBS (2) = OBS (1) modified by changing Var. (8).
OBS (3) = OBS (2) modified by changing Var. (2).
leaving 5 & 8
OBS (4) = High void levels, 2 and 5 already at desired level.
(5) = OBS (4) modified by changing Var. (8).

TABLE 10A

Mid-Level furnace run (#90), original data printout - variable designation Table No. 1A

1775.	6.	45.	800.	0.1	75.	100.	1.	1.745	0.0287	0.0227	573.64	9	0	1	1
1775.	6.	45.	800.	0.1	75.	100.	1.	1.760	0.0285	0.0225	581.72	9	0	1	2
1775.	6.	45.	800.	0.1	75.	100.	1.	1.750	0.0285	0.0225	540.17	9	0	1	3
1775.	6.	45.	800.	0.1	75.	100.	1.	1.755	0.0283	0.0223	533.78	9	0	1	4
1775.	6.	45.	800.	0.1	75.	100.	1.	1.750	0.0277	0.0217	557.16	9	0	1	5
1775.	6.	45.	800.	0.1	75.	100.	1.	1.740	0.0282	0.0222	523.43	9	0	1	6
1775.	6.	45.	800.	0.1	75.	100.	1.	1.767	0.0287	0.0226	587.30	9	0	1	7
1775.	6.	45.	800.	0.1	75.	100.	1.	1.767	0.0285	0.0224	554.02	9	0	1	8
1775.	6.	45.	800.	0.1	75.	100.	1.	1.735	0.0287	0.0227	478.03	9	0	1	9
1775.	6.	45.	800.	0.1	75.	100.	2.	1.678	0.0282	0.0224	509.28	9	0	2	10
1775.	6.	45.	800.	0.1	75.	100.	2.	1.785	0.0291	0.0230	557.98	9	0	2	11
1775.	6.	45.	800.	0.1	75.	100.	2.	1.775	0.0289	0.0228	498.38	9	0	2	12
1775.	6.	45.	800.	0.1	75.	100.	2.	1.725	0.0277	0.0218	498.51	9	0	2	13
1775.	6.	45.	800.	0.1	75.	100.	2.	1.752	0.0285	0.0225	581.72	9	0	2	14
1775.	6.	45.	800.	0.1	75.	100.	2.	1.752	0.0282	0.0222	537.57	9	0	2	15
1775.	6.	45.	800.	0.1	75.	100.	2.	1.745	0.0281	0.0221	527.16	9	0	2	16
1775.	6.	45.	800.	0.1	75.	100.	2.	1.765	0.0279	0.0218	592.55	9	0	2	17
1775.	6.	45.	800.	0.1	75.	100.	2.	1.733	0.0282	0.0223	452.69	9	0	2	18
1775.	6.	45.	800.	0.1	75.	100.	3.	1.725	0.0276	0.0217	540.43	9	0	3	19
1775.	6.	45.	800.	0.1	75.	100.	3.	1.705	0.0290	0.0232	494.95	9	0	3	20
1775.	6.	45.	800.	0.1	75.	100.	3.	1.720	0.0286	0.0227	467.63	9	0	3	21
1775.	6.	45.	800.	0.1	75.	100.	3.	1.760	0.0271	0.0211	643.37	9	0	3	22
1775.	6.	45.	800.	0.1	75.	100.	3.	1.712	0.0286	0.0227	508.89	9	0	3	23
1775.	6.	45.	800.	0.1	75.	100.	3.	1.720	0.0277	0.0218	542.49	9	0	3	24
1775.	6.	45.	800.	0.1	75.	100.	3.	1.765	0.0265	0.0204	688.86	9	0	3	25
1775.	6.	45.	800.	0.1	75.	100.	3.	1.750	0.0285	0.0225	512.47	9	0	3	26
1775.	6.	45.	800.	0.1	75.	100.	3.	1.715	0.0269	0.0210	637.43	9	0	3	27
1775.	6.	45.	800.	0.1	75.	100.	4.	1.710	0.0282	0.0223	551.72	9	0	4	28
1775.	6.	45.	800.	0.1	75.	100.	4.	1.760	0.0285	0.0225	554.02	9	0	4	29
1775.	6.	45.	800.	0.1	75.	100.	4.	1.760	0.0285	0.0225	554.02	9	0	4	30
1775.	6.	45.	800.	0.1	75.	100.	4.	1.745	0.0274	0.0214	599.37	9	0	4	31
1775.	6.	45.	800.	0.1	75.	100.	4.	1.750	0.0282	0.0222	523.43	9	0	4	32
1775.	6.	45.	800.	0.1	75.	100.	4.	1.760	0.0275	0.0215	595.04	9	0	4	33
1775.	6.	45.	800.	0.1	75.	100.	4.	1.770	0.0279	0.0218	520.29	9	0	4	34
1775.	6.	45.	800.	0.1	75.	100.	4.	1.780	0.0287	0.0226	532.66	9	0	4	35
1775.	6.	45.	800.	0.1	75.	100.	4.	1.735	0.0280	0.0220	559.03	9	0	4	36
1775.	6.	45.	800.	0.1	75.	100.	5.	1.691	0.0276	0.0218	502.13	9	0	5	37
1775.	6.	45.	800.	0.1	75.	100.	5.	1.736	0.0287	0.0227	540.32	9	0	5	38
1775.	6.	45.	800.	0.1	75.	100.	5.	1.750	0.0290	0.0230	548.45	9	0	5	39
1775.	6.	45.	800.	0.1	75.	100.	5.	1.724	0.0277	0.0218	513.17	9	0	5	40
1775.	6.	45.	800.	0.1	75.	100.	5.	1.734	0.0285	0.0226	512.47	9	0	5	41
1775.	6.	45.	800.	0.1	75.	100.	5.	1.767	0.0287	0.0226	532.66	9	0	5	42
1775.	6.	45.	800.	0.1	75.	100.	5.	1.740	0.0284	0.0224	488.18	9	0	5	43
1775.	6.	45.	800.	0.1	75.	100.	5.	1.752	0.0288	0.0228	515.41	9	0	5	44
1775.	6.	45.	800.	0.1	75.	100.	5.	1.742	0.0285	0.0225	554.02	9	0	5	45
1775.	6.	45.	800.	0.1	75.	100.	6.	1.760	0.0285	0.0225	581.72	9	0	6	46
1775.	6.	45.	800.	0.1	75.	100.	6.	1.753	0.0280	0.0220	617.03	9	0	6	47
1775.	6.	45.	800.	0.1	75.	100.	6.	1.745	0.0286	0.0226	591.41	9	0	6	48
1775.	6.	45.	800.	0.1	75.	100.	6.	1.745	0.0285	0.0225	609.42	9	0	6	49
1775.	6.	45.	800.	0.1	75.	100.	6.	1.765	0.0284	0.0223	599.77	9	0	6	50
1775.	6.	45.	800.	0.1	75.	100.	6.	1.740	0.0282	0.0222	608.31	9	0	6	51
1775.	6.	45.	800.	0.1	75.	100.	6.	1.705	0.0263	0.0205	634.32	9	0	6	52
1775.	6.	45.	800.	0.1	75.	100.	6.	1.715	0.0270	0.0211	632.72	9	0	6	53
1775.	6.	45.	800.	0.1	75.	100.	6.	1.740	0.0273	0.0213	588.70	9	0	6	54

TABLE 10B

Comparison of Actual and Predicted Values of Void and Strength for Mid-Level Run (Table 10A)

PREDICTED		ACTUAL	
Void	Strength	Void	Strength
.0229	657.83	.0227	573.64
.0227	666.12	.0225	581.72
.0227	666.12	.0225	540.17
.0225	674.41	.0223	533.78
.0219	699.27	.0217	557.16
.0224	678.55	.0222	523.43
.0229	657.83	.0226	587.30
.0227	666.12	.0224	554.02
.0229	657.83	.0227	478.03
.0226	669.35	.0224	509.28
.0235	629.19	.0230	557.98
.0233	638.11	.0228	498.38
.0221	691.66	.0218	498.51
.0229	655.96	.0225	581.72
.0226	669.35	.0222	537.57
.0225	673.81	.0221	527.16
.0223	682.73	.0218	592.55
.0226	669.35	.0223	452.69
.0221	688.83	.0217	546.43
.0235	621.90	.0232	494.95
.0231	641.02	.0227	467.63
.0216	712.73	.0211	643.37
.0231	641.02	.0227	508.89
.0222	684.05	.0218	542.49
.0210	741.41	.0204	688.86
.0231	645.80	.0225	512.47
.0214	722.29	.0210	637.43
.0228	650.94	.0223	551.72
.0231	635.64	.0225	554.02
.0231	635.64	.0225	554.02
.0221	691.73	.0214	599.39
.0228	650.94	.0222	523.43
.0222	686.63	.0215	595.04
.0226	666.24	.0218	520.29
.0233	625.45	.0226	532.66
.0227	661.14	.0220	559.63
.0224	674.24	.0218	502.13
.0235	614.65	.0227	546.32
.0238	598.40	.0230	548.45
.0225	668.82	.0218	513.17
.0233	625.49	.0226	512.47
.0235	614.65	.0226	532.66
.0232	630.90	.0224	488.18
.0236	609.23	.0228	515.41
.0233	625.49	.0225	554.02
.0234	615.33	.0225	581.72
.0229	644.00	.0220	617.03
.0235	609.59	.0226	591.41
.0234	615.32	.0225	609.42
.0233	621.06	.0223	599.77
.0231	632.53	.0222	608.31
.0212	741.51	.0205	634.32
.0219	701.36	.0211	632.72
.0222	684.15	.0213	588.70

PLAQUE STUDY - MID-LEVEL RUN (NO.9) WEIGHT PER 2. SQ. IN. TABLE 11 A

GROUP 1,	DF =	8..,	SSQ =	0.001012,	MS(VAR) =	0.000126,	SIG =	0.01125,	MEAN = 1.75211
GROUP 2,	DF =	8..,	SSQ =	0.008028,	MS(VAR) =	0.001003,	SIG =	0.03167,	MEAN = 1.74355
GROUP 3,	DF =	8..,	SSQ =	0.003923,	MS(VAR) =	0.000490,	SIG =	0.02214,	MEAN = 1.73022
GROUP 4,	DF =	8..,	SSQ =	0.003405,	MS(VAR) =	0.000425,	SIG =	0.02063,	MEAN = 1.75222
GROUP 5,	DF =	8..,	SSQ =	0.003622,	MS(VAR) =	0.000452,	SIG =	0.02127,	MEAN = 1.73733
GROUP 6,	DF =	8..,	SSQ =	0.003086,	MS(VAR) =	0.000385,	SIG =	0.01964,	MEAN = 1.74066
TOTAL,	DF =	53..,	SSQ =	0.0264493,	MS(VAR) =	0.000499,	SIG =	0.02233,	MEAN = 1.74305
WITHIN GR.,	DF =	48..,	SSQ =	0.02307942,	MS =	0.00048082			
BETWEEN GR,	DF =	5..,	SSQ =	0.00336989,	MS =	0.00067397			

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 1.401

PLAQUE STUDY - MID-LEVEL RUN (NO.9) THICKNESS X 10. TABLE NO. 11 B

GROUP 1,	DF =	8..,	SSQ =	0.000083,	MS(VAR) =	0.000010,	SIG =	0.00323,	MEAN = 0.28422
GROUP 2,	DF =	8..,	SSQ =	0.000162,	MS(VAR) =	0.000020,	SIG =	0.00451,	MEAN = 0.28311
GROUP 3,	DF =	8..,	SSQ =	0.000624,	MS(VAR) =	0.000078,	SIG =	0.00883,	MEAN = 0.27833
GROUP 4,	DF =	8..,	SSQ =	0.000160,	MS(VAR) =	0.000020,	SIG =	0.00447,	MEAN = 0.28099
GROUP 5,	DF =	8..,	SSQ =	0.000184,	MS(VAR) =	0.000023,	SIG =	0.00479,	MEAN = 0.28455
GROUP 6,	DF =	8..,	SSQ =	0.000528,	MS(VAR) =	0.000066,	SIG =	0.00812,	MEAN = 0.27800
TOTAL,	DF =	53..,	SSQ =	0.0020688,	MS(VAR) =	0.000039,	SIG =	0.00624,	MEAN = 0.28161
WITHIN GR.,	DF =	48..,	SSQ =	0.00174245,	MS =	0.00003630			
BETWEEN GR,	DF =	5..,	SSQ =	0.00032638,	MS =	0.00006527			

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 1.798

PLAQUE STUDY - MID-LEVEL RUN (NO.9) VOID X 10 TABLE 11 C

GROUP 1, DF = 8., SSQ =	0.000078, MS(VAR) =	0.000009, SIG =	0.00312, MEAN =	0.22599
GROUP 2, DF = 8., SSQ =	0.000133, MS(VAR) =	0.000016, SIG =	0.00408, MEAN =	0.22322
GROUP 3, DF = 8., SSQ =	0.000708, MS(VAR) =	0.000088, SIG =	0.00940, MEAN =	0.21699
GROUP 4, DF = 8., SSQ =	0.000156, MS(VAR) =	0.000019, SIG =	0.00442, MEAN =	0.22088
GROUP 5, DF = 8., SSQ =	0.000138, MS(VAR) =	0.000017, SIG =	0.00415, MEAN =	0.22466
GROUP 6, DF = 8., SSQ =	0.000442, MS(VAR) =	0.000055, SIG =	0.00744, MEAN =	0.21888
TOTAL, DF = 53., SSQ =	0.0019473, MS(VAR) =	0.000036, SIG =	0.00606, MEAN =	0.22177
WITHIN GR., DF = 48., SSQ =	0.00165733, MS =	0.00003452		
BETWEEN GR, DF = 5., SSQ =	0.00029000, MS =	0.00005800		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 1.679

PLAQUE STUDY - MID-LEVEL RUN (NO.9) STRENGTH X.01 TABLE NO.11D

GROUP 1, DF = 8., SSQ =	0.922124, MS(VAR) =	0.115265, SIG =	0.33950, MEAN =	5.47694
GROUP 2, DF = 8., SSQ =	1.581103, MS(VAR) =	0.197637, SIG =	0.44456, MEAN =	5.25420
GROUP 3, DF = 8., SSQ =	4.767595, MS(VAR) =	0.595949, SIG =	0.77197, MEAN =	5.60279
GROUP 4, DF = 8., SSQ =	0.630575, MS(VAR) =	0.078821, SIG =	0.28075, MEAN =	5.54466
GROUP 5, DF = 8., SSQ =	0.415643, MS(VAR) =	0.051955, SIG =	0.22793, MEAN =	5.23049
GROUP 6, DF = 8., SSQ =	0.278535, MS(VAR) =	0.034816, SIG =	0.18659, MEAN =	6.07044
TOTAL, DF = 53., SSQ =	12.6163511, MS(VAR) =	0.238044, SIG =	0.48789, MEAN =	5.52992
WITHIN GR., DF = 48., SSQ =	8.59557867, MS =	0.17907455		
BETWEEN GR, DF = 5., SSQ =	4.02077246, MS =	0.80415449		

F NUMBER (BETWEEN GR./WITHIN GR. MEAN SQUARES) = 4.490

Table No. 12A

ANOVA Details

Response = Weight per 2 sq.in.
Plaques = (9 Obs./Plaque)
Runs = (6 Plaques Per Run) 13 Runs
Groups = 5 Rep. Runs (1-5) +3 Single Runs
Group = Total Groups 8

ANOVA DETAIL

SOURCE	DF	SSQ	MS	F	Crit. F*
Between Groups	7	.01452	.00207	1.57	1.72
Within Gr. Bet. Runs	12-7 = 5	.14450-.01452 = .12998	.025996	19.69	1.85
Within Runs Bet. Pl.	77-12= 65	.45371-.14450 = .30921	.004757	3.60	1.24
Within Plaques	695-77=618	1.26924-.45371 = .815553	.001320	--	--
TOTAL	695	1.26924			

*90% C.L.

MODIFIED ACCUMULATIVE ANOVA

SOURCE	DF	SSQ	MS	S	Coeff. Var.**
Between Groups	7	.01452	.00207	.0455	2.69%
Within Groups	688	1.25472	.001824	.0427	2.53%
Within Runs	683	1.12474	.001647	.0406	2.40%
Within Plaques	618	.81553	.001320	.0363	2.15%
TOTAL	695	1.26924			

**(S/Mean x 100), Mean = 1.69

Table No. 12B

ANOVA DETAILS

Response = Thickness x 10

ANOVA DETAIL

SOURCE	DF	SSQ	MS	F	Crit. F*
Between Groups	7	.131334	.018762	175.10	1.72
Within Gr. Bet. Runs	12-7 = 5	.132596-.131334 = .001262	.000252	2.35	1.85
Within Runs Bet. Pl.	77-12= 65	.16649 -.132596 = .033894	.0005214	4.87	1.24
Within Plaques	695-77= 618	.066219	.00010715	--	--
TOTAL	95	.23271	--		

*90% C.L.

MODIFIED ACCUMULATIVE ANOVA

SOURCE	DF	SSQ	MS	S	Coef. Var.
Between Groups	7	.131333	.018762	.1370	47.56%
Within Groups	688	.101379	.00014735	.01214	4.21%
Within Runs	683	.100116	.00014658	.01210	4.20%
Within Plaques	618	.066219	.00010715	.01035	3.59%
TOTAL	695	.23271	--		

**(S/Mean) x 100 MEAN = .28804

Table No. 12C

Response Void x 10

ANOVA DETAIL

SOURCE	DF	SSQ	MS	F	F Crit.*
Between Groups	7	.133456	.019065	180.64	1.72
Within Gr. Bet. Runs	12-7 = 5	.13444 - .133456 = .000984	.0001968	1.86	1.85
Within Runs Bet. Pl.	77-12= 65	.167641 - .13444 = .033201	.0005108	4.84	1.24
Within Pl.	695-77= 618	.065224	.00010554	--	--
TOTAL	695	.2328654		--	--

*90% C.L.

MODIFIED ACCUMULATIVE ANOVA

SOURCE	DF	SSQ	MS	S	Coef. Var.**
Between Groups	7	.133456	.019065	.138	59.98%
Within Groups	688	.099409	.00014449	.01202	5.22
Within Runs	683	.0984194	.00014409	.01200	5.22
Within Plaques	618	.065224	.0001055	.01027	4.46
TOTAL	695	.2328654	--	--	--

**(S/Mean) x 100, Mean = .23009

Table No. 12D

Response - Strength x .01

ANOVA DETAIL

SOURCE	DF	SSQ	MS	F	Crit. F*
Between Groups	7	1811.507	258.786	545.2	1.72
Within Gr. Bet. Runs	12-7 = 5	1834.752-1811.507 = 23.245	4.6490	9.77	1.85
Within Runs Bet. Pl.	77-12= 65	1955.824-1834.752 = 12.107	.18626	.39	1.24
With Plaques	695-77= 618	293.952	.47565	--	--
TOTAL	695	2249.776			

*90% C.L.

MODIFIED ACCUMULATIVE ANOVA

SOURCE	DF	SSQ	MS	S	Coef. Var.*
Between Groups	7	1811.507	258.787	16.08	319.0%
Within Groups	688	438.269	.63702	.798	15.82%
Within Runs	683	415.023	.60765	.779	15.45%
Within Plaques	618	293.952	.47565	.6895	13.87%
TOTAL	695	2249.776			

**(S/Mean) x 100, $\overline{X}$ = 5.04307

TABLE 13A SLOPES FOR THICKNESS RESPONSE

```
RESPONSE = THICKNESS, SLOPE FOR TEMPERATURE, VAR. 1
VAR. USED =   1 10 16
MAX. DY/DX =       0.00529
MIN. DY/DX =      -0.00529

RESPONSE = THICKNESS, SLOPE FOR BELT SPEED, VAR. 2
VAR. USED =   2 18 19 20 23 24 10
MAX. DY/DX =       0.01252
MIN. DY/DX =      -0.01252

RESPONSE = THICKNESS, SLOPE FOR DEW POINT, VAR. 3
VAR. USED =   3 22 26 27 29 30 18
MAX. DY/DX =       0.03170
MIN. DY/DX =      -0.03170

RESPONSE = THICKNESS, SLOPE FOR ATMOSPHERE AMOUNT VAR. 4
VAR. USED =   4 31 32 33 34 35 19
MAX. DY/DX =       0.02779
MIN. DY/DX =      -0.02779

RESPONSE = THICKNESS, SLOPE FOR PLAQUE SPACING, VAR. 5
VAR. USED =   5 11 12 13 36 32 31 26 20
MAX. DY/DX =       0.04039
MIN. DY/DX =      -0.04039

RESPONSE = THICKNESS, SLOPE FOR 1ST WATER COOLING ZONE, VAR. 6
VAR. USED =   6 14 15 17 36 27
MAX. DY/DX =       0.01379
MIN. DY/DX =      -0.01379

RESPONSE = THICKNESS, SLOPE FOR 2ND WATER COOLING ZONE, VAR. 7
VAR. USED =   7 21 25 33 22 14 11
MAX. DY/DX =       0.00589
MIN. DY/DX =      -0.00589

RESPONSE = THICKNESS, SLOPE FOR PLAQUE SEQUENCE, VAR. 8
VAR. USED =   8 28 34 29 23 21 16 15 12
MAX. DY/DX =       0.01045
MIN. DY/DX =      -0.01045

RESPONSE = THICKNESS, SLOPE FOR PLAQUE WEIGHT (2. SQ IN), VAR. 9
VAR. USED =   9 35 28 25 24 17 13 30
MAX. DY/DX =       0.01723
MIN. DY/DX =      -0.01723
```

TABLE 13B - SLOPES FOR VOID RESPONSE

```
RESPONSE = VOID,  SLOPE FOR TEMPERATURE VAR. 1
VAR. USED =   1 11 14 15 16
MAX. DY/DX =       0.03371
MIN. DY/DX =      -0.03371


RESPONSE = VOID, SLOPE FOR  BELT SPEED, VAR. 2
VAR. USED =   2 20 21 23 24
MAX. DY/DX =       0.00149
MIN. DY/DX =      -0.00149


RESPONSE = VOID, SLOPE FOR  DEW POINT, VAR. 3
VAR. USED =   3 26 28 29 30 11
MAX. DY/DX =       0.00971
MIN. DY/DX =      -0.00971


RESPONSE = VOID, SLOPE FOR  VAR.  4 ATMOS. AMOUNT
VAR. USED =   4 31 32 33 34 35
MAX. DY/DX =       0.00135
MIN. DY/DX =      -0.00135


RESPONSE = VOID, SLOPE FOR  PLAQUE SPACING, VAR. 5
VAR. USED =   5 12 13 36 31 26 20 10
MAX. DY/DX =       0.00349
MIN. DY/DX =      -0.00349


RESPONSE = VOID, SLOPE FOR  1ST WATER COOLING ZONE VAR. 6
VAR. USED =   6 17 18 19 36 32 21 14
MAX. DY/DX =       0.00178
MIN. DY/DX =      -0.00178


RESPONSE = VOID, SLOPE FOR  2ND WATER COOLING ZONE VAR. 7
VAR. USED =   7 22 25 33 28 17 15 10
MAX. DY/DX =       0.03586
MIN. DY/DX =      -0.03586


RESPONSE = VOID, SLOPE FOR  PLAQUE SEQUENCE  VAR. 8
VAR. USED =   8 27 34 29 23 22 18 16 12
MAX. DY/DX =       0.00411
MIN. DY/DX =      -0.00411


RESPONSE = VOID, SLOPE FOR  THICKNESS,  VAR. 9
VAR. USED =   9 35 30 27 25 24 19 13
MAX. DY/DX =       0.00668
MIN. DY/DX =      -0.00668
```

```
RESPONSE = STRENGTH, MAX. SLOPE FOR TEMPERATURE VAR. 1
VAR. USED =   1 13 14 15 16 17
MAX. DY/DX =   1949.17969
MIN. DY/DX =  -1949.17969
```

TABLE NO. 13C SLOPES FOR STRENGTH RESPONSE

```
RESPONSE STRENGTH MAX. DYDX,  VAR. = BELT SPEED VAR. 2
VAR. USED =   2 18 20 23 24
MAX. DY/DX =    505.91308
MIN. DY/DX =   -505.91308
```

```
RESPONSE = STRENGTH,  MAX. SLOPE FOR DEW POINT  VAR. 3
VAR. USED =   3 26 27 29 30  2
MAX. DY/DX =    909.77404
MIN. DY/DX =   -909.77404
```

```
RESPONSE = STRENGTH,  MAX. SLOPE FOR ATMOS. AMOUNT, VAR. 4
VAR. USED =   4 31 33 34 35
MAX. DY/DX =    973.16699
MIN. DY/DX =   -973.16699
```

```
RESPONSE = STRENGTH,  MAX. SLOPE FOR PLAQUE SPACING VAR. 5
VAR. USED =   5 10 11 12 36  4  3  2  1
MAX. DY/DX =   1312.18603
MIN. DY/DX =  -1312.18603
```

```
RESPONSE = STRENGTH,  MAX. SLOPE FOR 1ST WATER COOL. ZONE, VAR. 6
VAR. USED =   6 19 21 22  3  5
MAX. DY/DX =    316.42114
MIN. DY/DX =   -316.42114
```

```
RESPONSE = STRENGTH,  MAX. SLOPE FOR 2ND WATER COOL. ZONE VAR. 7
VAR. USED =   7 25 28 33 19 15 10
MAX. DY/DX =   1056.52832
MIN. DY/DX =  -1056.52832
```

```
RESPONSE = STRENGTH,  MAX. SLOPE FOR PLAQ. SEQUENCE, VAR. 8
VAR. USED =   8 32  4  3  7  2  6  1  5
MAX. DY/DX =   1807.62671
MIN. DY/DX =  -1807.62671
```

```
RESPONSE = STRENGTH,  MAX. SLOPE FOR THICKNESS,  VAR. 9
VAR. USED =   9  5  1  6  2  7  3  8  4
MAX. DY/DX =   1859.35425
MIN. DY/DX =  -1859.35425
```

Table No. 14

Comparison Mid-Level Run #9
With Original Data

Within Plaques

Response	MS Ratio	F (Crit. F (618,48,.10)=1.44)
Weight	.00132/.000481 =	2.74
Thickness	.000107/.0000363 =	2.95
Void	.0001055/.0000345=	3.06
Strength	.47565/.1791 =	2.66

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WINNIE M. MORGAN NASA HEADQUARTERS CODE US 2 0001 label #	E. M. COHN NASA HEADQUARTERS CODE RNW 0003
GERALD HALPERT GSFC CODE 764 0006	THOMAS HENNIGAN GSFC CODE 761 0007
JOHN L. PATTERSON MS 472 LANGLEY RESEARCH CENTER 0010	M. B. SEYFFERT MS 112 LANGLEY RESEARCH CENTER 0011
W. E. RICE MANNED SPACECRAFT CENTER CODE EP-5 0015	JON RUBENZER BIOSATELLITE PROJECT AMES RESEARCH CENTER CODE PBS, M. S. 244-2 0016
DR. R. LUTWACK,MS 198-220 JET PROPULSION LABORATORY 4800 OAK GROVE DRIVE PASADENA, CAL 91103 0019	MR. ALVIN UCHIYAMA, MS 198-223 JET PROPULSION LABORATORY 4800 OAK GROVE DRIVE PASADENA, CAL 91103 0020
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MISSILE & SPACE DIVISION
SPACECRAFT DEPARTMENT
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NEWPORT BEACH, CAL 92663

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GENERAL ELECTRIC COMPANY
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RAI RESEARCH CORPORATION
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LONG ISLAND CITY, N.Y. 11101

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A. MUNDEL SONOTONE CORPORATION SAW MILL RIVER ROAD ELMSFORD, NEW YORK 10523 0113	LIBRARY SOUTHWEST RESEARCH INSTITUTE 8500 CULEBRA ROAD SAN ANTONIO, TEXAS 78206 0114
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MR. A.D. TONELLI MS 7C MCDONNELL DOUGLAS, INC. 3000 OCEAN PARK BLVD. SANTA MONICA, CAL 90406 0115	1 MR C BANCROFT 2 R-1/2094 3 TRW SYSTEMS, INC. 4 ONE SPACE PARK 5 REDONDO BEACH, CAL 90278 6 7 8 0116
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